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SATELLITE ORBITAL DATA

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Smithsonian Institution
Astrophysical Observatory

Cambridge 38, Massachusetts

CR-50,800

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ORBITAL INFORMATION[1]

The orbital elements have been derived by the indicated staff members of the Satellite Tracking Program, Smithsonian Astrophysical Observatory, employing the SAO Differential Orbit Improvement Program (DOI).

Field-reduced photographs from SAO Baker-Nunn cameras comprise the majority of observations used in computing these orbital data. SAO Moonwatch teams, the NASA Minitrack network, foreign observatories miscellaneous U.S. and foreign observers, and various radar installations also contribute valuable observations.

As opposed to osculating elements, the elements presented here are mean elements in the sense that the effects of the short period perturbations due to the earth's oblateness have been eliminated.

SAO mean elements have been derived from observations covering several days, and are given in the form of a table. The successive sets of elements are essentially independent of each other. They are dependent, however, in the sense that high-order coefficients in the secular and the long-periodic terms are generally considered as known and as constant for periods of several weeks or months, as dictated by convenience.

The times of epoch in the mean elements are reckoned in Julian Days, but for the sake of convenience the number 2400000.5 has been subtracted to provide an abbreviated notation which we call "Modified Julian Days," or "MJD."

The units of the orbital elements are degrees for angular quantities, megameters (Mm = 10^6 meters) for linear quantities, and revolutions for the mean anomaly M and its derivatives.

The tabulated values of the SAO mean elements give the values of argument of perigee ω, right ascension of the ascending node Ω, inclination i, eccentricity e, and mean anomaly M as functions of time $t = T - T_o$ (where T_o is the reference epoch) expressed in days. The single digit placed at the right of each value represents the standard error for that element and refers to the last digit given.

The same tabulation also gives the mean (anomalistic) motion n, the orbital acceleration $n'/2$ or n' (dn/dt), and the semimajor axis a or the geocentric distance of perigee q (in megameters). Of the last three columns, the one headed N indicates the number of observations used for the computation of a set of elements; the one headed D, the number of days used; and the one headed σ, the standard error of the representation of the observations relative to their assumed accuracy.

SAO smoothed elements have been derived from observations covering about two weeks or more. They are given as functions of time and generally include both secular and periodic terms. The general expression for any element E is

$$E = E_o + E_1 t + E_2 t^2 + \ldots + \sum A_i \sin(B_i + C_i t) \quad ,$$

[1]This work was supported in part by grant NsG 87-60 from the National Aeronautics and Space Administration.

where $t = T - T_o$ is again expressed in days. The presence of a standard error associated with a particular coefficient indicates that this quantity was determined by the process of differential orbit improvement; the absence of a standard error means that the quantity was taken from some other source.

In our computer program, the inclination and the argument of perigee are referred to the true equator of date, the right ascension of the ascending node, however, is reckoned from the mean equinox of 1950.0 along the corresponding mean equator to the intersection with the moving true equator of date, and then along the true equator of date. To transform from right ascension of the node as determined by the DOI to right ascension of the node referred to the mean equinox of date, one uses

$$\Omega^\circ = \Omega^\circ(\text{DOI}) + 3^\circ.508 \times 10^{-5} (\text{MJD} - 33281) ,$$

where MJD stands for the Modified Julian Day of the date.

The mean (anomalistic) motion n can be obtained from the smoothed elements by differentiating the expression for M, and the orbital acceleration n' can be obtained by twice differentiating the same expression for M.

The sun-perigee data are related to the perturbing effects of atmospheric drag. From left to right, are the Modified Julian Day (MJD); the perigee height Z (in kilometers) above the International Ellipsoid of Reference; the geocentric latitude of the perigee (φ); the angular geocentric distance (ψ) from the perigee of the sun; and the difference in right ascension (D.R.A.) between the perigee and the sun; all these angles are expressed in degrees. In the last column we give the range of change of the period ($\dot{P}$) expressed in days per day.

Satellite 1958 Alpha (Explorer I) Beatrice Miller

I. SAO smoothed elements

The following elements are based on 39 observations and are valid for the period January 1 through January 16, 1962.

T_o = 37672.0 MJD

$\omega = (74^\circ.52 \pm 3) + (7^\circ.418 \pm 6)t - ^\circ.0005731\,t^2 + ^\circ.2789 \cos \omega$

$\Omega = (101^\circ.89 \pm 2) - (4^\circ.985 \pm 2)t - ^\circ.667 \times 10^{-4} t^2 + ^\circ.0093 \cos \omega$

$i = (33^\circ.220 \pm 5) + ^\circ.0006713\,t - ^\circ.1427 \times 10^{-4} t^2 - ^\circ.0039 \sin \omega$

$e = (.09471 \pm 6) - .8820 \times 10^{-4} t - .1345 \times 10^{-5} t^2 + .0004697 \sin \omega$

$M = (.54181 \pm 7) + (13.56570 \pm 1)t + (.621 \pm 6) \times 10^{-4} t^2 + (.15 \pm 12) \times 10^{-6} t^3 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 4''.05$.

The following elements are based on 104 observations and are valid for the period January 16 through February 1, 1962.

T_o = 37688.0 MJD

$\omega = (193^\circ.03 \pm 5) + (7^\circ.536 \pm 6)t - ^\circ.0005731\,t^2 + ^\circ.2789 \cos \omega$

$\Omega = (22^\circ.037 \pm 5) - (4^\circ.993 \pm 1)t - ^\circ.667 \times 10^{-4} t^2 + ^\circ.0093 \cos \omega$

$i = (33^\circ.209 \pm 2) + ^\circ.0002147\,t - ^\circ.143 \times 10^{-4} t^2 - ^\circ.0039 \sin \omega$

$e = (.09536 \pm 3) - .00013124t - .1345 \times 10^{-5} t^2 + .0004697 \sin \omega$

$M = (.6107 \pm 2) + (13.56743 \pm 2)t + (.732 \pm 9) \times 10^{-4} t^2 + (.35 \pm 3) \times 10^{-5} t^3 - (.15 \pm 2) \times 10^{-6} t^4 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.65$.

The following elements are based on 126 observations and are valid for the period February 1 through February 15, 1962.

$T_o = 37703.0$ MJD

$\omega = (305^\circ.563 \pm 8) + (7^\circ.438 \pm 2)t + {}^\circ.000886t^2 + {}^\circ.2789 \cos \omega$

$\Omega = (307^\circ.108 \pm 4) - (4^\circ.997 \pm 1)t - {}^\circ.0001235t^2 + {}^\circ.0093 \cos \omega$

$i = (33^\circ.2054 \pm 9) - {}^\circ.0006531t + {}^\circ.1507 \times 10^{-4}t^2 - {}^\circ.0039 \sin \omega$

$e = (.09432 \pm 2) + .4421 \times 10^{-4}t - .1359 \times 10^{-5}t^2 + .0004697 \sin \omega$

$M = (.14403 \pm 2) + (13.570465 \pm 6)t + (.819 \pm 6) \times 10^{-4}t^2 - (.17 \pm 4) \times 10^{-6}t^3 +$

$(.11 \pm 1) \times 10^{-6}t^4 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 2''.25$.

The following elements are based on 64 observations and are valid for the period February 15 through March 1, 1962.

$T_o = 37717.0$ MJD

$\omega = (50^\circ.062 \pm 8) + (7^\circ.443 \pm 1)t + {}^\circ.000886t^2 + {}^\circ.2789 \cos \omega$

$\Omega = (237^\circ.140 \pm 2) - (4^\circ.9973 \pm 5)t - {}^\circ.0001235t^2 + {}^\circ.0093 \cos \omega$

$i = (33^\circ.2011 \pm 8) - {}^\circ.0002312t + {}^\circ.1507 \times 10^{-4}t^2 - {}^\circ.0039 \sin \omega$

$e = (.09425 \pm 2) + .616 \times 10^{-5}t - .1359 \times 10^{-5}t^2 + .0004697 \sin \omega$

$M = (.14938 \pm 3) + (13.573621 \pm 4)t + (.0001527 \pm 5)t^2 + (.398 \pm 6) \times 10^{-5}t^3 -$

$(.19 \pm 12) \times 10^{-7}t^4 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.10$.

The following elements are based on 95 observations and are valid for the period March 1 through March 16, 1962.

$T_o = 37731.0$ MJD

$\omega = (154^\circ.51 \pm 1) + (7^\circ.475 \pm 3)t + {}^\circ.000886t^2 + {}^\circ.2789 \cos \omega$

$\Omega = (167^\circ.135 \pm 4) - (5^\circ.0015 \pm 9)t - {}^\circ.0001235t^2 + {}^\circ.0093 \cos \omega$

$i = (33^\circ.204 \pm 1) + {}^\circ.0001908t + {}^\circ.1507 \times 10^{-4}t^2 - {}^\circ.0039 \sin \omega$

$e = (.09396 \pm 1) - .3189 \times 10^{-4}t - .1359 \times 10^{-5}t^2 + .0004697 \sin \omega$

$M = (.21665 \pm 4) + (13.578770 \pm 8)t + (.0001483 \pm 5)t^2 - (.205 \pm 5) \times 10^{-5}t^3 +$

$(.140 \pm 9) \times 10^{-6}t^4 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 2''.00$.

The following elements are based on 99 observations and are valid for the period March 16 through April 1, 1962.

$T_o = 37747.0$ MJD

$\omega = (274^\circ.04 \pm 2) + (7^\circ.487 \pm 3)t + {}^\circ.000886\,t^2 + {}^\circ.2789 \cos \omega$

$\Omega = (87^\circ.072 \pm 3) - (5^\circ.014 \pm 1)t - {}^\circ.0001235\,t^2 + {}^\circ.0093 \cos \omega$

$i = (33^\circ.202 \pm 1) + {}^\circ.0006730\,t + {}^\circ.1507 \times 10^{-4} t^2 - {}^\circ.0039 \sin \omega$

$e = (.09390 \pm 2) - .7538 \times 10^{-4} t - {}^\circ.1359 \times 10^{-5} t^2 + .0004697 \sin \omega$

$M = (.51700 \pm 5) + (13.58445 \pm 1)t + (.0002698 \pm 4)t^2 + (.254 \pm 3) \times 10^{-5} t^3 - (.212 \pm 6) \times 10^{-6} t^4 - .0007550 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.58$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37668.0	44.89 3	121.89 1	33.202 4	.09496 6	.27962 6	13.565248 4	.75E-4 2	6.719821	31	8	1.04
37672.0	74.60 4	101.90 2	33.208 6	.0950 1	.54157 9	13.565757 5	.55E-4 2	6.719215	16	8	1.08
37676.0	104.18 4	81.95 2	33.203 7	.09524 7	.80562 8	13.566265 6	.73E-4 3	6.717410	9	8	1.24
37680.0	133.89 6	61.98 2	33.201 8	.09480 9	.0714 1	13.566769 8	.63E-4 2	6.720505	8	8	1.78
37684.0	163.70 7	42.02 1	33.228 9	.09470 8	.3389 2	13.56727 1	.82E-4 4	6.721103	19	8	.91
37688.0	193.3 1	22.04 1	33.214 4	.0947 1	.6095 5	13.567824 3	.78E-4 1	6.720944	46	8	.87
37692.0	222.95 1	2.054 8	33.211 2	.09449 3	.88230 5	13.568476 2	.1041E-3 9	6.722253	72	8	.71
37696.0	253.21 2	342.076 8	33.213 1	.09397 4	.15613 7	13.569220 2	.852E-4 9	6.725868	80	8	.84
37700.0	283.283 6	322.098 3	33.2112 7	.09387 2	.43335 2	13.569883 1	.881E-4 4	6.726426	81	8	.52
37704.0	313.15 1	302.116 4	33.206 1	.09408 2	.71418 3	13.570603 1	.833E-4 7	6.724592	82	8	.94
37708.0	343.11 1	282.129 4	33.207 1	.09415 2	.99746 3	13.571341 1	.1009E-3 7	6.723861	47	8	.75
37712.0	13.04 2	262.141 6	33.204 2	.09431 5	.28408 6	13.572330 2	.136E-3 2	6.722359	32	8	1.08
37716.0	42.77 1	242.148 3	33.199 1	.09468 3	.57551 4	13.573398 2	.148E-3 1	6.719267	39	8	.60
37720.0	72.57 2	222.140 6	33.194 2	.09461 4	.87124 7	13.574773 2	.188E-3 1	6.719321	42	8	.90
37724.0	102.210 9	202.137 3	33.197 1	.09456 1	.17355 3	13.576368 1	.2044E-3 6	6.719119	47	8	.50
37728.0	131.95 1	182.132 3	33.200 1	.09434 1	.48208 3	13.577861 1	.1774E-3 6	6.720252	61	8	.64
37732.0	161.69 1	162.122 3	33.2026 7	.09413 1	.79640 3	13.579117 1	.1314E-3 5	6.721444	49	8	.45
37736.0	191.61 2	142.114 4	33.2057 9	.09373 1	.11482 5	13.580170 1	.1449E-3 5	6.724036	34	8	.50
37740.0	221.51 5	122.11 1	33.209 3	.09365 4	.4380 1	13.581289 3	.151E-3 1	6.724289	32	8	.98
37744.0	251.67 5	102.081 7	33.211 3	.09341 3	.7657 2	13.582829 4	.235E-3 2	6.725533	38	8	1.20
37748.0	281.67 2	82.062 3	33.214 2	.09313 1	.10136 6	13.584892 2	.2683E-3 7	6.726944	47	8	.48
37752.0	311.74 2	62.024 5	33.208 2	.09332 2	.44541 5	13.587090 1	.2754E-3 6	6.720837	62	8	.53

Table 1

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1958 ALPHA

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN EARTH SHADOW			
37668.	345.	22.7	127.4	237.4	-0.815E-06
37672.	347.	31.9	122.2	245.0	-0.598E-06
37676.	345.	32.1	113.0	255.7	-0.793E-06
		PERIGEE IN SUNLIGHT			
37680.	345.	23.2	103.7	263.6	-0.685E-06
37684.	343.	8.8	96.2	266.7	-0.891E-06
37688.	343.	-7.2	90.0	267.4	-0.847E-06
37692.	347.	-21.9	83.3	270.0	-0.113E-05
37696.	353.	-31.6	74.3	278.1	-0.925E-06
37700.	354.	-32.2	65.1	289.7	-0.957E-06
37704.	350.	-23.5	58.6	298.2	-0.905E-06
37708.	346.	-9.2	57.2	301.7	-0.110E-05
37712.	344.	7.1	59.8	303.1	-0.148E-05
37716.	344.	21.8	62.2	306.0	-0.161E-05
37720.	347.	31.5	60.1	313.9	-0.204E-05
37724.	347.	32.4	52.1	325.2	-0.222E-05
37728.	345.	24.0	39.6	334.0	-0.192E-05
37732.	344.	9.9	26.6	337.7	-0.143E-05
37736.	346.	-6.3	20.9	339.3	-0.157E-05
37740.	349.	-21.3	26.1	342.4	-0.164E-05
37744.	353.	-31.3	32.5	350.6	-0.255E-05
37748.	355.	-32.4	34.1	2.4	-0.291E-05
37752.	350.	-24.1	29.5	11.7	-0.298E-05

Satellite 1959 Alpha 1 (Vanguard II) Maria Gutierrez

I. SAO smoothed elements

The following elements are based on 330 observations and are valid for the period July 31 through August 31, 1961

T_o = 37526.0 MJD

$\omega = (255^\circ.703 \pm 6) + (5^\circ.2878 \pm 8)t + ^\circ.11 \times 10^{-4}t^2 + ^\circ.1366 \cos \omega$

$\Omega = (229^\circ.413 \pm 2) - (3^\circ.5180 \pm 2)t - ^\circ.7 \times 10^{-5}t^2 + ^\circ.0144 \cos \omega$

$i = (32^\circ.8753 \pm 6) - ^\circ.00630 \sin \omega$

$e = (.164287 \pm 9) - (.44 \pm 9) \times 10^{-5}t + .000420 \sin \omega$

$M = (.29600 \pm 2) + (11.474908 \pm 3)t + (.553 \pm 3) \times 10^{-5}t^2 + (.14 \pm 3) \times 10^{-7}t^3 - .000385 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.40$.

The following elements are based on 215 observations and are valid for the period August 31 through September 30, 1961.

T_o = 37556.0 MJD

$\omega = (54^\circ.386 \pm 9) + (5^\circ.291 \pm 1)t + ^\circ.11 \times 10^{-4}t^2 + ^\circ.1366 \cos \omega$

$\Omega = (123^\circ.891 \pm 2) - (3^\circ.5169 \pm 3)t - ^\circ.7 \times 10^{-5}t^2 + ^\circ.0144 \cos \omega$

$i = (32^\circ.8766 \pm 8) - ^\circ.00630 \sin \omega$

$e = (.16425 \pm 1) + (.53 \pm 11) \times 10^{-5}t + .000420 \sin \omega$

$M = (.54805 \pm 3) + (11.475260 \pm 4)t + (.815 \pm 3) \times 10^{-5}t^2 + (.9 \pm 4) \times 10^{-8}t^3 - .000385 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.45$.

The following elements are based on 214 observations and are valid for the period September 30 through October 31, 1961.

$T_o = 37588.0$ MJD

$\omega = (223°.643 \pm 5) + (5°.2885 \pm 6)t - °.29 \times 10^{-3} t^2 + °.1366 \cos \omega$

$\Omega = (11°.341 \pm 2) - (3°.5173 \pm 2)t - °.3 \times 10^{-4} t^2 + °.0144 \cos \omega$

$i = (32°.8807 \pm 6) - °.00630 \sin \omega$

$e = (.16425 \pm 1) + (.35 \pm 13) \times 10^{-5} t + .000420 \sin \omega$

$M = (.76534 \pm 2) + (11.475864 \pm 2)t + (.1094 \pm 2) \times 10^{-4} t^2 - (.76 \pm 3) \times 10^{-7} t^3 - .000385 \cos \omega$

Standard error of one observation: $\sigma = \pm 1'.20$.

The following elements are based on 154 observations and are valid for the period October 31 through November 30, 1961.

$T_o = 37618.0$ MJD

$\omega = (22°.356 \pm 4) + (5°.2908 \pm 4)t - °.29 \times 10^{-3} t^2 + °.1366 \cos \omega$

$\Omega = (265°.789 \pm 2) - (3°.5182 \pm 2)t - °.3 \times 10^{-4} t^2 + °.0144 \cos \omega$

$i = (32°.8786 \pm 6) - °.00630 \sin \omega$

$e = (.16431 \pm 2) + (.13 \pm 2) \times 10^{-4} t + .000420 \sin \omega$

$M = (.049421 \pm 9) + (11.476418 \pm 1)t + (.918 \pm 3) \times 10^{-5} t^2 - (.111 \pm 2) \times 10^{-6} t^3 - .000385 \cos \omega$

Standard error of one observation: $\sigma = \pm 1'.40$.

The following elements are based on 201 observations and are valid for the period November 30 through December 31, 1961.

$T_o = 37648.0$ MJD

$\omega = (181°.032 \pm 4) + (5°.2922 \pm 4)t - °.29 \times 10^{-3} t^2 + °.1366 \cos \omega$

$\Omega = (160°.237 \pm 3) - (3°.5191 \pm 3)t - °.3 \times 10^{-4} t^2 + °.0144 \cos \omega$

$i = (32°.8757 \pm 8) - °.00630 \sin \omega$

$e = (.16443 \pm 2) + (.12 \pm 22) \times 10^{-5} t + .000420 \sin \omega$

$M = (.34798 \pm 1) + (11.476782 \pm 1)t + (.546 \pm 3) \times 10^{-5} t^2 - (.1 \pm 3) \times 10^{-8} t^3 - .000385 \cos \omega$

Standard error of one observation: $\sigma = \pm 1'.95$.

The following elements are based on 132 observations and are valid for the period December 31, 1961 through January 31, 1962.

$T_o = 37680.0$ MJD

$\omega = (350^\circ.263 \pm 5) + (5^\circ.2899 \pm 5)t + ^\circ.12 \times 10^{-3} t^2 + ^\circ.1377 \cos \omega$

$\Omega = (47^\circ.632 \pm 3) - (3^\circ.5182 \pm 3)t - ^\circ.15 \times 10^{-4} t^2 + ^\circ.0143 \cos \omega$

$i = (32^\circ.888 \pm 1) - ^\circ.00626 \sin \omega$

$e = (.16418 \pm 2) + (.32 \pm 2) \times 10^{-4} t + .000420 \sin \omega$

$M = (.61061 \pm 2) + (11.477109 \pm 1)t + (.40 \pm 4) \times 10^{-5} t^2 - (.65 \pm 43) \times 10^{-8} t^3 - .000388 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.70$.

The following elements are based on 106 observations and are valid for the period January 31 through February 28, 1962.

$T_o = 37710.0$ MJD

$\omega = (148^\circ.957 \pm 6) + (5^\circ.2880 \pm 7)t + ^\circ.12 \times 10^{-3} t^2 + ^\circ.1377 \cos \omega$

$\Omega = (302^\circ.066 \pm 2) - (3^\circ.5187 \pm 3)t - ^\circ.15 \times 10^{-4} t^2 + ^\circ.0143 \cos \omega$

$i = (32^\circ.8801 \pm 7) - ^\circ.00626 \sin \omega$

$e = (.16441 \pm 1) - (.51 \pm 13) \times 10^{-5} t + .000420 \sin \omega$

$M = (.92747 \pm 1) + (11.477333 \pm 2)t + (.282 \pm 4) \times 10^{-5} t^2 + (.85 \pm 38) \times 10^{-8} t^3 - .000388 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.38$.

The following elements are based on 121 observations and are valid for the period February 28 through March 31, 1962.

$T_o = 37738.0$ MJD

$\omega = (297^\circ.097 \pm 5) + (5^\circ.2917 \pm 5)t + ^\circ.12 \times 10^{-3} t^2 + ^\circ.1377 \cos \omega$

$\Omega = (203^\circ.515 \pm 2) - (3^\circ.5201 \pm 2)t - ^\circ.15 \times 10^{-4} t^2 + ^\circ.0143 \cos \omega$

$i = (32^\circ.8783 \pm 6) - ^\circ.00626 \sin \omega$

$e = (.164364 \pm 7) - (.40 \pm 7) \times 10^{-5} t + .000420 \sin \omega$

$M = (.29538 \pm 1) + (11.477509 \pm 1)t + (.245 \pm 2) \times 10^{-5} t^2 + (.33 \pm 2) \times 10^{-7} t^3 - .000388 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.03$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37512.0	181.52 2	278.647 4	32.879 1	.16430 1	.64876 5	11.47481 2	.24E-5 8	6.937688	57	8	.50
37514.0	192.15 2	271.621 4	32.882 1	.16417 2	.59811 6	11.47482 2	.35E-5 7	6.938757	59	8	.50
37516.0	202.70 1	264.580 3	32.881 1	.16413 1	.54782 5	11.47479 2	.30E-5 8	6.939082	77	8	.51
37518.0	213.29 1	257.547 3	32.880 1	.16408 1	.49740 4	11.47481 2	.49E-5 7	6.939462	83	8	.52
37520.0	223.87 1	250.511 3	32.875 1	.16404 2	.44707 4	11.47486 2	.66E-5 7	6.939768	88	8	.51
37522.0	234.46 1	243.476 3	32.8782 9	.16402 2	.39673 5	11.47484 2	.68E-5 6	6.940004	90	8	.47
37524.0	245.04 1	236.446 3	32.8789 8	.16397 2	.34643 5	11.47487 2	.82E-5 6	6.940369	94	8	.45
37526.0	255.65 2	229.411 3	32.8792 8	.16393 2	.29615 6	11.47492 2	.82E-5 5	6.940711	101	8	.44
37528.0	266.29 1	222.374 3	32.8803 9	.16388 2	.24576 5	11.47492 2	.72E-5 8	6.941094	105	8	.50
37530.0	276.891 8	215.343 3	32.880 1	.16383 2	.19559 3	11.47494 1	.77E-5 7	6.941491	120	8	.51
37532.0	287.490 7	208.309 3	32.880 1	.16383 2	.14546 3	11.47496 1	.88E-5 7	6.941481	106	8	.51
37534.0	298.11 1	201.276 3	32.880 3	.16385 2	.09535 4	11.47501 1	.57E-5 6	6.941337	84	8	.49
37536.0	308.71 1	194.242 3	32.878 2	.16389 2	.04532 5	11.47500 1	.46E-5 6	6.940955	49	8	.49
37538.0	319.30 2	187.208 4	32.880 2	.16393 2	.99533 7	11.47505 2	.52E-5 8	6.940611	54	8	.55
37540.0	329.92 2	180.174 4	32.879 1	.16397 2	.94528 6	11.47510 2	.53E-5 8	6.940399	60	8	.55
37542.0	340.49 2	173.143 4	32.878 1	.16404 1	.89543 6	11.47509 2	.64E-5 7	6.939724	69	8	.50
37544.0	351.07 1	166.109 3	32.878 1	.164183 9	.84558 5	11.47511 2	.64E-5 6	6.939031	85	8	.47
37546.0	1.67 1	159.078 3	32.8770 9	.164212 8	.79573 4	11.47510 2	.61E-5 5	6.938267	95	8	.47
37548.0	12.24 1	152.046 3	32.876 1	.164309 8	.74599 4	11.47515 2	.66E-5 5	6.937442	92	8	.46
37550.0	22.81 1	145.011 3	32.875 1	.164401 8	.69630 3	11.47518 2	.72E-5 5	6.936671	87	8	.43
37552.0	33.37 1	137.977 3	32.874 3	.16449 1	.64669 3	11.47521 1	.96E-5 6	6.935936	78	8	.45
37554.0	43.93 1	130.940 3	32.873 1	.16457 1	.59717 4	11.47524 1	.99E-5 7	6.935283	61	8	.44
37556.0	54.47 1	123.900 3	32.872 1	.16460 1	.54777 4	11.47528 1	.110E-4 5	6.934956	55	8	.44
37558.0	65.02 2	116.861 3	32.872 2	.16464 2	.49842 5	11.47532 2	.114E-4 7	6.934590	52	8	.44
37560.0	75.60 2	109.821 4	32.872 2	.16469 2	.44907 6	11.47530 2	.96E-5 7	6.934206	43	8	.46
37562.0	86.13 2	102.788 4	32.872 2	.16470 2	.39993 6	11.47541 2	.71E-5 9	6.934073	40	8	.44
37564.0	96.69 2	95.750 4	32.872 2	.16473 2	.35077 7	11.47544 2	.6E-5 1	6.933819	31	8	.41
37566.0	107.25 2	88.713 5	32.870 3	.16472 3	.30165 8	11.47546 3	.6E-5 1	6.933922	26	8	.51
37568.0	117.80 2	81.678 6	32.870 3	.16469 3	.25260 8	11.47545 2	.8E-5 1	6.934158	24	8	.44
37570.0	128.35 2	74.648 5	32.872 2	.16427 2	.20361 6	11.47549 2	.93E-5 9	6.934963	27	8	.44
37572.0	138.90 2	67.613 5	32.873 2	.16453 2	.15468 6	11.47551 2	.106E-4 8	6.935450	37	8	.48

T (MJD)	ω	Ω	i	e	M	n	ṅ/2	q	N	D	σ
37574.0	149.47 1	60.576 4	32.875 1	.16443 2	.10579 4	11.47556 1	.[illegible]E-4 6	6.936254	56	8	.44
37576.0	160.04 1	53.534 3	32.876 1	.16437 1	.05696 3	11.47559 1	.114E-4 6	6.936769	68	8	.44
37578.0	170.609 9	46.493 3	32.877 1	.16429 1	.00823 3	11.475643 8	.129E-4 5	6.937432	74	8	.46
37580.0	181.180 7	39.458 3	32.8802 9	.164201 1	.95957 2	11.475676 6	.128E-4 5	6.938123	84	8	.43
37582.0	191.70 7	32.43 3	32.882 2	.16411 3	.9111 2	11.47567 9	.1E-4 1	6.938894	21	8	.49
37584.0	202.35 2	25.396 7	32.884 1	.16406 2	.86244 5	11.47574 2	.15E-4 3	6.939302	38	8	.48
37586.0	213.939 9	18.642 4	32.886 1	.16399 2	.81402 3	11.475792 8	.124E-4 9	6.939860	59	8	.47
37588.0	223.535 8	11.321 4	32.886 1	.16395 2	.76567 2	11.475845 7	.119E-4 6	6.940131	70	8	.51
37590.0	234.140 8	4.287 4	32.887 1	.16391 2	.71738 2	11.475863 6	.84E-4 6	6.940450	62	8	.48
37592.0	244.719 7	357.258 3	32.888 1	.16383 2	.66922 2	11.475892 5	.78E-5 5	6.941088	56	8	.45
37594.0	255.33 1	350.232 5	32.888 2	.16386 4	.62100 4	11.47591 1	.8E-5 1	6.940894	43	8	.59
37596.0	265.93 2	343.204 9	32.889 3	.16391 5	.57287 7	11.47597 2	.11E-4 2	6.940390	39	8	.71
37598.0	276.55 2	336.164 9	32.891 4	.16392 6	.52482 8	11.47599 1	.10E-4 2	6.940350	28	8	.76
37600.0	287.17 3	329.12 1	32.893 6	.16397 9	.4768 1	11.47605 2	.11E-4 2	6.939886	20	8	.84
37602.0	297.76 3	322.09 1	32.897 6	.16395 9	.42901 8	11.47606 3	.10E-4 2	6.940025	21	8	.85
37604.0	308.35 2	315.057 6	32.892 5	.16394 6	.38126 5	11.47611 1	.8E-5 1	6.940105	38	8	.79
37606.0	318.93 2	308.023 5	32.889 4	.16391 5	.33359 4	11.47613 1	.105E-4 9	6.940347	43	8	.69
37608.0	329.54 1	300.982 3	32.885 3	.16397 4	.28593 3	11.476193 7	.102E-4 7	6.939801	46	8	.55
37610.0	340.146 8	293.945 3	32.883 2	.16408 3	.23834 2	11.476239 5	.118E-4 5	6.938879	51	8	.51
37612.0	350.741 8	286.911 4	32.884 2	.16420 3	.19087 2	11.476292 5	.110E-4 5	6.937899	44	8	.51
37614.0	1.323 7	279.876 5	32.881 2	.16429 3	.14350 2	11.476340 5	.119E-4 6	6.937155	42	8	.47
37616.0	11.909 7	272.839 5	32.878 2	.16439 3	.09623 1	11.476390 5	.103E-4 6	6.936266	40	8	.47
37618.0	22.481 7	265.799 6	32.876 2	.16448 3	.04907 1	11.476438 5	.94E-5 4	6.935479	39	8	.47
37620.0	33.045 6	258.763 5	32.875 1	.16458 3	.00199 1	11.476476 4	.81E-5 3	6.934628	35	8	.43
37622.0	43.604 7	251.724 5	32.874 1	.16467 3	.95498 1	11.476514 4	.78E-5 3	6.933915	34	8	.47
37624.0	54.164 7	244.683 5	32.873 1	.16478 3	.90804 1	11.476539 5	.74E-5 4	6.933389	34	8	.53
37626.0	64.716 7	237.643 6	32.872 1	.16438 3	.86116 1	11.476572 5	.59E-5 4	6.933081	36	8	.58
37628.0	75.261 8	230.610 7	32.871 1	.16480 3	.81433 1	11.476595 5	.60E-5 5	6.932810	37	8	.60
37630.0	85.812 7	223.574 5	32.870 1	.16483 3	.76753 1	11.476615 4	.65E-5 4	6.932507	43	8	.59
37632.0	96.361 5	216.536 4	32.868 1	.16482 2	.720791 9	11.476635 4	.60E-5 4	6.932578	48	8	.58

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37634.0	106.907 6	209.499 4	32.869 2	.16485 3	.67409 1	11.476662 5	.67E-5 6	6.932369	44	8	.65
37636.0	117.481 5	202.462 3	32.869 1	.16480 2	.62739 1	11.476678 6	.81E-5 5	6.932745	40	8	.47
37638.0	128.030 5	195.419 3	32.869 1	.16470 3	.58083 1	11.476731 3	.89E-5 4	6.933576	41	8	.46
37640.0	138.578 7	188.373 4	32.870 1	.16458 4	.53437 2	11.476748 6	.56E-5 9	6.934550	46	8	.57
37642.0	149.136 6	181.335 4	32.871 1	.16431 3	.48787 1	11.47677 1	.65E-5 9	6.935018	44	8	.48
37644.0	159.703 5	174.297 3	32.872 1	.16452 3	.44138 1	11.476763 5	.71E-5 7	6.935010	51	8	.50
37646.0	170.272 8	167.259 4	32.876 1	.16448 3	.39495 2	11.476781 8	.48E-5 6	6.935338	53	8	.62
37648.0	180.850 8	160.222 4	32.875 1	.16439 3	.34854 2	11.476790 8	.33E-5 8	6.936132	56	8	.69
37650.0	191.440 6	153.183 3	32.876 1	.16431 3	.30211 2	11.476796 6	.49E-5 5	6.936745	60	8	.65
37652.0	202.027 6	146.143 4	32.878 1	.16422 3	.25573 2	11.476798 6	.30E-5 6	6.937511	55	8	.67
37654.0	212.633 6	139.107 4	32.879 1	.16415 3	.20932 2	11.476792 5	.11E-5 6	6.938142	55	8	.65
37656.0	223.227 5	132.071 4	32.882 1	.16412 3	.16291 1	11.476804 5	.103E-4 6	6.938349	43	8	.52
37658.0	233.833 5	125.034 1	32.883 1	.16406 3	.11656 1	11.476844 5	.100E-4 7	6.938867	46	8	.52
37660.0	244.438 4	117.997 3	32.8854 9	.16397 3	.07030 1	11.476871 3	.68E-5 4	6.939582	54	8	.45
37662.0	255.043 4	110.958 3	32.8862 9	.16396 3	.02406 1	11.476882 4	.125E-4 5	6.939605	51	8	.41
37664.0	265.657 4	103.919 3	32.886 1	.16392 2	.97788 1	11.476924 4	.83E-5 5	6.939928	53	8	.42
37666.0	276.248 6	96.883 5	32.888 1	.16393 3	.93181 1	11.476966 5	.67E-5 7	6.939842	54	8	.61
37668.0	286.850 7	89.854 6	32.887 2	.16404 4	.88572 1	11.476964 6	.10E-4 1	6.938912	45	8	.65
37670.0	297.44 1	82.824 9	32.887 3	.16407 5	.83975 2	11.47700 1	.3E-5 2	6.938645	42	8	.73
37672.0	308.05 2	75.785 1	32.889 3	.16417 9	.79373 5	11.47698 3	.4E-5 2	6.937855	45	8	.75
37674.0	318.68 2	68.748 9	32.887 3	.16420 7	.74768 8	11.47698 2	.2E-5 1	6.937656	46	8	.61
37676.0	329.15 9	61.71 1	32.887 4	.1639 2	.7023 4	11.47709 6	.6E-5 1	6.939774	35	8	.42
37678.0	339.7 1	54.68 1	32.883 6	.1640 3	.6564 4	11.47702 6	.5E-5 2	6.939426	41	8	.59
37680.0	350.46 2	47.635 7	32.888 4	.16432 7	.61009 8	11.47714 4	.32E-5 7	6.936565	28	8	.29
37682.0	1.02 2	40.61 1	32.881 8	.1643 1	.56439 6	11.47713 8	.2E-5 2	6.936425	29	8	.57
37684.0	11.596 7	33.571 5	32.878 5	.16438 5	.51866 3	11.477139 8	.4E-5 1	6.936080	22	8	.34
37686.0	22.16 1	26.527 5	32.889 5	.16457 5	.47300 3	11.477160 8	.7E-5 1	6.934472	18	8	.54
37688.0	32.73 1	19.491 6	32.893 8	.16467 4	.42738 3	11.47719 1	.3E-5 2	6.933611	17	8	.66
37690.0	43.30 1	12.459 8	32.888 6	.16474 3	.38177 3	11.477197 8	.25E-5 7	6.933029	17	8	.62
37692.0	53.85 1	5.415 7	32.880 4	.16481 3	.33623 2	11.477222 7	.6E-5 1	6.932442	23	8	.58
37694.0	64.41 1	358.375 7	32.879 3	.16487 2	.29073 2	11.477245 8	.46E-5 5	6.931978	27	8	.55

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37696.0	74.98 1	351.338 7	32.878 2	.16488 2	.24525 2	11.477261 6	.34E-5 6	6.931837	30	8	.52
37698.0	85.52 1	344.299 7	32.878 2	.16489 2	.19983 2	11.477288 6	.25E-5 5	6.931746	34	8	.64
37700.0	96.08 1	337.256 6	32.875 1	.16489 2	.15444 2	11.477317 7	.29E-5 6	6.931785	31	8	.54
37702.0	106.619 9	330.214 5	32.874 1	.16486 2	.10908 2	11.477327 5	.39E-5 3	6.931989	34	8	.53
37704.0	117.16 1	323.177 5	32.8743 9	.16482 2	.06377 2	11.477328 5	.38E-5 8	6.932296	34	8	.50
37706.0	127.715 9	316.135 5	32.875 1	.16478 2	.01844 2	11.477334 5	.16E-5 4	6.932671	36	8	.53
37708.0	138.272 8	309.094 4	32.876 1	.16471 2	.97313 2	11.477341 5	.14E-5 5	6.933224	41	8	.54
37710.0	148.83 1	302.054 5	32.877 1	.16423 2	.92781 2	11.477343 7	.28E-5 6	6.933906	35	8	.56
37712.0	159.41 1	295.014 4	32.878 1	.16453 2	.88250 2	11.477343 6	.30E-5 6	6.934703	39	8	.58
37714.0	169.98 1	287.977 4	32.877 2	.16444 2	.83720 2	11.477347 8	.40E-5 6	6.935433	34	8	.54
37716.0	180.57 1	280.939 5	32.877 2	.16434 2	.79191 3	11.477348 9	.25E-5 7	6.936283	25	8	.51
37718.0	191.15 1	273.902 4	32.876 2	.16424 1	.74664 1	11.477368 6	.37E-5 5	6.937110	26	8	.41
37720.0	201.72 1	266.867 7	32.875 2	.16418 2	.70146 3	11.47739 1	.54E-5 8	6.937643	18	8	.45
37722.0	212.30 2	259.839 6	32.873 3	.16418 3	.65623 3	11.477364 8	.47E-5 9	6.937639	18	8	.50
37724.0	222.89 1	252.790 4	32.878 2	.16414 2	.61106 3	11.477383 7	.40E-5 8	6.937960	22	8	.49
37726.0	233.509 8	245.746 3	32.882 2	.16410 2	.56586 2	11.477389 9	.26E-5 5	6.938312	27	8	.41
37728.0	244.142 6	238.708 2	32.882 2	.16402 1	.52065 2	11.477402 6	.17E-5 5	6.938922	31	8	.38
37730.0	254.752 8	231.666 4	32.881 2	.16399 1	.47551 2	11.477417 7	.21E-5 6	6.939210	30	8	.48
37732.0	265.367 7	224.619 4	32.878 2	.16395 1	.43040 2	11.477446 4	.15E-5 5	6.939464	34	8	.39
37734.0	275.970 9	217.577 5	32.877 2	.16395 2	.38532 2	11.477455 5	.25E-5 5	6.939521	31	8	.29
37736.0	286.57 1	210.537 6	32.877 2	.16396 2	.34027 3	11.477456 7	.30E-5 7	6.939425	33	8	.42
37738.0	297.17 1	203.505 5	32.880 2	.16399 2	.29522 2	11.477461 6	.18E-5 6	6.939149	39	8	.41
37740.0	307.750 9	196.474 5	32.881 1	.16405 2	.25024 3	11.477489 8	.15E-5 8	6.938640	30	8	.40
37742.0	318.36 1	189.440 4	32.882 1	.16407 2	.20520 2	11.477501 7	.22E-5 6	6.938479	28	8	.40
37744.0	328.96 1	182.400 4	32.882 1	.16411 1	.16024 2	11.477520 8	.25E-5 5	6.938137	28	8	.40
37746.0	339.55 1	175.365 5	32.880 1	.16418 1	.11528 3	11.477525 8	.44E-5 5	6.937587	26	8	.38
37748.0	350.15 1	168.327 4	32.879 1	.16425 1	.07039 2	11.477533 5	.29E-5 4	6.936952	34	8	.48
37750.0	.75 1	161.286 6	32.879 1	.16432 1	.02551 3	11.477546 9	.41E-5 4	6.936425	34	8	.41
37752.0	11.32 2	154.255 7	32.877 2	.16440 1	.98073 3	11.47758 1	.42E-5 5	6.935695	37	8	.52
37754.0	21.92 1	147.207 6	32.879 2	.16445 1	.93594 3	11.477616 9	.28E-5 5	6.935322	33	8	.37

Table 2

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37512.	559.	-0.8	35.9	329.0	-0.365E-07
37514.	561.	-6.6	39.0	329.0	-0.532E-07
37516.	562.	-12.1	42.2	329.1	-0.456E-07
37518.	563.	-17.3	45.2	329.7	-0.744E-07
37520.	564.	-22.1	47.6	330.8	-0.100E-06
37522.	566.	-26.2	49.4	332.6	-0.103E-06
37524.	567.	-29.5	50.4	335.0	-0.125E-06
37526.	568.	-31.7	50.5	338.2	-0.125E-06
37528.	569.	-32.8	49.5	341.8	-0.109E-06
37530.	569.	-32.6	47.6	345.5	-0.117E-06
37532.	569.	-31.2	44.7	349.0	-0.134E-06
37534.	568.	-28.6	41.0	352.0	-0.866E-07
37536.	566.	-25.1	36.4	354.3	-0.699E-07
37538.	565.	-20.7	31.2	356.0	-0.790E-07
37540.	564.	-15.8	25.5	357.0	-0.805E-07
37542.	562.	-10.4	19.4	357.5	-0.972E-07
37544.	561.	-4.8	13.1	357.7	-0.972E-07
37546.	560.	0.9	6.8	357.8	-0.927E-07
37548.	559.	6.6	2.1	357.9	-0.100E-06
37550.	559.	12.1	6.5	358.2	-0.109E-06
37552.	559.	17.4	12.3	358.8	-0.146E-06
37554.	560.	22.1	17.8	0.0	-0.150E-06
37556.	561.	26.2	22.7	1.8	-0.167E-06

Table 2 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37558.	561.	29.5	27.0	4.4	-0.173E-06
37560.	562.	31.7	30.5	7.6	-0.146E-06
37562.	562.	32.8	33.2	11.1	-0.108E-06
37564.	562.	32.6	35.0	14.8	-0.911E-07
37566.	561.	31.2	36.0	18.4	-0.911E-07
37568.	561.	28.7	36.1	21.3	-0.122E-06
37570.	560.	25.2	35.5	23.7	-0.141E-06
37572.	560.	20.9	34.2	25.3	-0.161E-06
37574.	559.	16.0	32.5	26.4	-0.169E-06
37576.	559.	10.7	30.6	26.9	-0.173E-06
37578.	559.	5.1	28.8	27.1	-0.196E-06
37580.	560.	-0.6	27.5	27.1	-0.194E-06
37582.	561.	-6.3	27.0	27.1	-0.152E-06
37584.	562.	-11.9	27.5	27.4	-0.228E-06
37586.	563.	-17.6	30.1	29.3	-0.188E-06
37588.	565.	-22.0	31.0	29.2	-0.181E-06
37590.	566.	-26.1	33.7	31.0	-0,128E-05
37592.	568.	-29.4	36.7	33.5	-0.118E-06
37594.	568.	-31.7	39.6	36.6	-0.121E-06
37596.	568.	-32.8	42.4	40.1	-0.167E-06
37598.	568.	-32.6	44.9	43.8	-0.152E-06
37600.	567.	-31.3	47.0	47.2	-0.167E-06
37602.	567.	-28.7	48.8	50.2	-0.152E-06
37604.	566.	-25.2	50.2	52.4	-0.121E-06

Table 2 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37606.	565.	-20.9	51.4	53.9	-0.159E-06
37608.	563.	-16.0	52.6	54.8	-0.155E-06
37610.	561.	-10.6	53.8	55.2	-0.179E-06
37612.	560.	-5.0	55.3	55.2	-0.167E-06
37614.	559.	0.7	57.1	55.1	-0.181E-06
37616.	558.	6.4	59.4	54.9	-0.156E-06
37618.	558.	12.0	62.1	55.0	-0.143E-06
37620.	558.	17.2	65.3	55.4	-0.123E-06
37622.	559.	22.0	68.8	56.3	-0.118E-06
37624.	559.	26.1	72.5	57.8	-0.112E-06
37626.	560.	29.4	76.2	60.0	-0.896E-07
37628.	560.	31.7	79.7	62.8	-0.911E-07
37630.	560.	32.8	82.9	66.0	-0.987E-07
37632.	560.	32.6	85.5	69.4	-0.911E-07
37634.	560.	31.3	87.4	72.6	-0.102E-06
37636.	559.	28.8	88.5	75.2	-0.123E-06
37638.	559.	25.3	88.7	77.2	-0.135E-06
37640.	559.	21.0	88.0	78.5	-0.850E-07
37642.	558.	16.2	86.6	79.1	-0.987E-07
37644.	557.	10.9	84.6	79.3	-0.108E-06
37646.	557.	5.3	82.1	79.1	-0.729E-07
37648.	558.	-0.5	79.5	78.8	-0.501E-07
37650.	559.	-6.2	77.0	78.5	-0.744E-07
37652.	560.	-11.7	74.8	78.3	-0.456E-07

Table 2 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37654.	562.	-17.0	73.1	78.6	-0.167E-07
37656.	563.	-21.8	72.2	79.3	-0.156E-06
37658.	565.	-26.0	72.1	80.8	-0.152E-06
37660.	566.	-29.3	72.9	82.9	-0.103E-06
37662.	567.	-31.6	74.5	85.6	-0.190E-06
37664.	568.	-32.8	76.8	88.9	-0.126E-06
37666.	568.	-32.7	79.6	92.2	-0.102E-06
37668.	566.	-31.3	82.7	95.4	-0.152E-06
37670.	565.	-28.8	85.9	98.1	-0.456E-07
37672.	563.	-25.3	89.1	100.1	-0.607E-07
37674.	562.	-21.0	92.1	101.4	-0.304E-07
37676.	563.	-16.2	94.7	102.0	-0.911E-07
37678.	562.	-10.9	97.2	102.2	-0.759E-07
37680.	558.	-5.2	99.5	102.3	-0.486E-07
37682.	558.	0.6	101.4	102.0	-0.304E-07
37684.	558.	6.3	103.1	101.7	-0.607E-07
37686.	557.	11.8	104.8	101.7	-0.106E-06
37688.	557.	17.1	106.6	102.0	-0.455E-07
37690.	558.	21.9	108.4	102.9	-0.380E-07
37692.	558.	26.0	110.5	104.4	-0.911E-07
37694.	559.	29.3	112.8	106.6	-0.698E-07
		PERIGEE IN EARTH SHADOW			
37696.	559.	31.6	115.3	109.5	-0.516E-07
37698.	560.	32.8	117.9	112.8	-0.380E-07

Table 2 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37700.	560.	32.7	120.6	116.3	-0.440E-07
37702.	559.	31.3	123.1	119.6	-0.592E-07
37704.	559.	28.9	125.3	122.4	-0.577E-07
37706.	558.	25.4	127.1	124.6	-0.243E-07
37708.	558.	21.2	128.3	126.1	-0.213E-07
37710.	557.	16.3	128.8	127.0	-0.425E-07
37712.	557.	11.0	128.6	127.5	-0.455E-07
37714.	557.	5.4	127.8	127.6	-0.607E-07
37716.	558.	-0.3	126.7	127.5	-0.380E-07
37718.	559.	-6.0	125.3	127.5	-0.562E-07
37720.	560.	-11.6	123.9	127.7	-0.820E-07
37722.	561.	-16.9	122.8	128.2	-0.714E-07
37724.	563.	-21.7	122.2	129.3	-0.607E-07
37726.	564.	-25.9	122.2	131.0	-0.395E-07
37728.	566.	-29.2	122.9	133.5	-0.258E-07
37730.	567.	-31.6	124.4	136.6	-0.319E-07
37732.	567.	-32.8	126.8	140.2	-0.228E-07
37734.	567.	-32.7	129.9	143.9	-0.380E-07
37736.	567.	-31.4	133.6	147.4	-0.455E-07
37738.	566.	-28.9	137.8	150.5	-0.273E-07
37740.	564.	-25.4	142.3	152.9	-0.228E-07
37742.	563.	-21.1	146.8	154.6	-0.334E-07

Table 2 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ALPHA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37744.	561.	-16.3	151.0	155.7	-0.380E-07
37746.	560.	-10.9	154.3	156.2	-0.668E-07
37748.	559.	-5.3	156.2	156.5	-0.440E-07
37750.	558.	0.4	156.4	156.5	-0.622E-07
37752.	558.	6.1	154.9	156.6	-0.638E-07
37754.	558.	11.7	152.2	156.9	-0.425E-07

Satellite 1959 Eta (Vanguard III) Martha Hall

I. SAO smoothed elements

The following elements are based on 326 observations and are valid for the period January 1 through February 1, 1962.

$T_o = 37678.0$ MJD

$\omega = (318^\circ.423 \pm 8) + (4^\circ.8929 \pm 7)t - ^\circ.0002610\,t^2 + ^\circ.1170 \cos \omega$

$\Omega = (329^\circ.082 \pm 2) - (3^\circ.2833 \pm 2)t - ^\circ.422 \times 10^{-4} t^2 + ^\circ.0160 \cos \omega$

$i = (33^\circ.3580 \pm 9) - ^\circ.0005256\,t - ^\circ.0071 \sin \omega$

$e = (.188600 \pm 9) + ^\circ.1467 \times 10^{-4} t + .0004175 \sin \omega$

$M = (.82195 \pm 3) + (11.084528 \pm 2)t + (.570 \pm 4) \times 10^{-5} t^2 + (.39 \pm 3) \times 10^{-7} t^3 - .0003331 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.68$.

The following elements are based on 161 observations and are valid for the period February 1 through March 1, 1962.

$T_o = 37712.0$ MJD

$\omega = (124^\circ.633 \pm 9) + (4^\circ.8950 \pm 8)t - ^\circ.000261\,t^2 + ^\circ.1170 \cos \omega$

$\Omega = (217^\circ.395 \pm 3) - (3^\circ.2836 \pm 3)t + ^\circ.422 \times 10^{-4} t^2 + ^\circ.0160 \cos \omega$

$i = (33^\circ.347 \pm 1) + ^\circ.0005256\,t - ^\circ.0071 \sin \omega$

$e = (.18855 \pm 1) + .1467 \times 10^{-4} t + .0004175 \sin \omega$

$M = (.70288 \pm 3) + (11.084899 \pm 3)t + (.840 \pm 5) \times 10^{-5} t^2 + (.99 \pm 6) \times 10^{-7} t^3 - .0003331 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.55$.

The following elements are based on 244 observations and are valid for the period March 1 through April 1, 1962.

$T_o = 37738.0$ MJD

$\omega = (251^\circ.821 \pm 8) + (4^\circ.8966 \pm 5)t - ^\circ.0002610\,t^2 + ^\circ.1170 \cos \omega$

$\Omega = (131^\circ.995 \pm 2) - (3^\circ.2858 \pm 2)t - ^\circ.422 \times 10^{-4} t^2 + ^\circ.0160 \cos \omega$

$i = (33^\circ.3534 \pm 8) - ^\circ.0005256\,t - ^\circ.0071 \sin \omega$

$e = (.18862 \pm 2) + .1467 \times 10^{-4} t + .0004175 \sin \omega$

$M = (.91685 \pm 3) + (11.085362 \pm 2)t + (.1014 \pm 4) \times 10^{-4} t^2 + (.156 \pm 3) \times 10^{-6} t^3 - .0003331 \cos \omega$

Standard error of one observation: $\sigma = 1''.63$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37668.0	269.40 2	1.915 3	33.367 2	.18823 1	.97738 5	11.084385 2	.6E-5 1	6.896435	76	6	.45
37672.0	288.98 2	348.793 5	33.370 2	.18827 2	.31519 6	11.084420 2	.3E-5 1	6.896053	62	6	.54
37676.0	308.59 2	335.653 6	33.365 2	.18822 2	.65309 7	11.084465 3	.8E-5 2	6.896439	65	6	.58
37680.0	328.20 2	322.521 5	33.363 1	.18831 1	.99112 6	11.084528 2	.6E-5 1	6.895651	52	6	.48
37684.0	347.80 2	309.389 5	33.357 1	.18847 2	.32931 6	11.084584 2	.7E-5 1	6.894252	40	6	.40
37688.0	7.34 1	296.253 5	33.353 2	.18853 2	.66792 4	11.084650 1	.5E-5 1	6.893758	56	6	.39
37692.0	26.88 1	283.115 3	33.348 2	.18869 2	.00666 4	11.084714 2	.8E-5 1	6.892383	67	6	.41
37696.0	46.464 7	269.972 3	33.342 2	.18888 2	.34546 3	11.084778 2	.8E-5 1	6.890700	52	6	.38
37700.0	65.985 9	256.824 4	33.339 2	.18908 2	.68461 4	11.084821 3	.8E-5 1	6.888970	52	6	.47
37704.0	85.48 1	243.679 5	33.340 2	.18904 3	.02404 4	11.084878 2	.5E-5 2	6.889329	33	6	.44
37708.0	105.00 1	230.532 5	33.343 2	.18907 3	.36354 4	11.084932 4	.11E-4 2	6.889014	31	6	.54
37712.0	124.53 1	217.385 4	33.342 2	.18864 2	.70319 6	11.084992 3	.10E-4 2	6.889792	25	6	.39
37716.0	144.10 3	204.249 8	33.344 1	.18881 2	.21305 7	11.085081 2	.12E-4 1	6.891876	22	6	.40
37720.0	163.64 2	191.109 4	33.347 1	.18866 2	.38309 6	11.085118 2	.9E-5 1	6.892450	27	6	.36
37724.0	183.22 1	177.969 4	33.351 1	.18852 2	.72344 4	11.085213 2	.10E-4 1	6.893603	50	6	.47
37728.0	202.77 1	164.831 4	33.354 1	.18841 2	.06424 4	11.085282 2	.12E-4 1	6.894528	58	6	.52
37732.0	222.36 2	151.693 5	33.356 1	.18835 3	.40522 7	11.085362 3	.12E-4 2	6.894979	41	6	.49
37736.0	241.93 2	138.561 5	33.357 2	.18832 4	.74651 5	11.085431 3	.13E-4 2	6.895177	37	6	.51
37740.0	261.59 3	125.418 9	33.356 4	.18891 8	.0877 1	11.085450 6	.12E-4 3	6.893654	35	6	1.03
37744.0	281.16 3	112.29 1	33.357 6	.1883 1	.4295 1	11.085551 6	.22E-4 5	6.895114	23	6	1.07
37748.0	300.82 2	99.145 5	33.360 3	.18842 7	.77144 7	11.085683 3	.18E-4 2	6.894281	47	6	.81
37752.0	320.35 1	86.003 4	33.359 2	.18835 4	.11429 4	11.085819 4	.17E-4 2	6.894822	54	6	.55

Table 3

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 ETA

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37668.	525.	-33.4	15.6	346.9	-0.977E-07
37672.	523.	-31.3	11.2	352.5	-0.488E-07
37676.	522.	-25.5	5.0	356.3	-0.130E-06
37680.	519.	-16.8	4.7	357.8	-0.977E-07
37684.	516.	-6.7	13.8	357.5	-0.114E-06
37688.	515.	4.0	23.6	356.6	-0.814E-07
37692.	515.	14.4	33.0	356.1	-0.130E-06
37696.	516.	23.5	40.9	357.2	-0.130E-06
37700.	516.	30.1	46.3	0.6	-0.130E-06
37704.	517.	33.2	48.5	6.1	-0.814E-07
37708.	517.	32.1	47.1	12.2	-0.179E-06
37712.	516.	26.9	42.4	16.8	-0.163E-06
37716.	516.	18.8	35.1	19.2	-0.195E-06
37720.	515.	8.9	26.7	19.6	-0.146E-06
37724.	515.	-1.8	20.0	19.2	-0.163E-06
37728.	517.	-12.3	19.6	18.9	-0.195E-06
37732.	520.	-21.7	25.8	20.1	-0.195E-06
37736.	522.	-29.0	34.1	23.4	-0.212E-06
37740.	522.	-33.0	41.6	29.1	-0.195E-06
37744.	523.	-32.6	46.8	35.7	-0.358E-06
37748.	521.	-28.2	49.4	41.1	-0.293E-06
37752.	519.	-20.5	49.3	44.1	-0.277E-06

Satellite 1959 Iota 1 (Explorer VII)

Beatrice Miller

I. SAO smoothed elements

The following elements are based on 122 observations and are valid for the period January 1 through February 1, 1962.

$T_o = 37680.0$ MJD

$\omega = (341^\circ.20 \pm 3) + (3^\circ.393 \pm 3)t + ^\circ.0005820\,t^2 + 1^\circ.3047 \cos \omega$

$\Omega = (294^\circ.440 \pm 2) - (4^\circ.1899 \pm 2)t - ^\circ.729 \times 10^{-5} t^2 + ^\circ.0034 \cos \omega$

$i = (50^\circ.309 \pm 1) - ^\circ.0014 \sin \omega$

$e = (.03617 \pm 1) - (.61 \pm 11) \times 10^{-5} t + .000806 \sin \omega$

$M = (.29466 \pm 9) + (14.232261 \pm 9)t + (.175 \pm 5) \times 10^{-5} t^2 + (.69 \pm 5) \times 10^{-7} t^3 - .0029222 \cos \omega$

Standard error of one observation: $\sigma = \pm 2''.13$.

The following elements are based on 100 observations and are valid for the period February 1 through March 1, 1962.

$T_o = 37710.0$ MJD

$\omega = (83^\circ.47 \pm 2) + (3^\circ.399 \pm 3)t + ^\circ.0005820\,t^2 + 1^\circ.3047 \cos \omega$

$\Omega = (168^\circ.743 \pm 2) - (4^\circ.1900 \pm 2)t + ^\circ.323 \times 10^{-5} t^2 + ^\circ.0034 \cos \omega$

$i = (50^\circ.308 \pm 1) - ^\circ.0014 \sin \omega$

$e = (.03626 \pm 2) - (.37 \pm 21) \times 10^{-5} t + .000806 \sin \omega$

$M = (.26509 \pm 5) + (14.232453 \pm 8)t + (.86 \pm 51) \times 10^{-7} t^2 + (.100 \pm 6) \times 10^{-6} t^3 - .0029222 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.70$.

The following elements are based on 86 observations and are valid for the period March 1 through April 1, 1962.

$T_o = 37740.0$ MJD

$\omega = (185^\circ.71 \pm 2) + (3^\circ.406 \pm 2)t + {}^\circ.0005820\, t^2 + 1^\circ.3047 \cos \omega$

$\Omega = (43^\circ.0489 \pm 9) - (4^\circ.1898 \pm 1)t + {}^\circ.323 \times 10^{-5} t^2 + {}^\circ.0034 \cos \omega$

$i = (50^\circ.3106 \pm 7) - {}^\circ.0014 \sin \omega$

$e = (.03615 \pm 1) - (.32 \pm 16) \times 10^{-5} t + .000806 \sin \omega$

$M = (.24017 \pm 5) + (14.232537 \pm 5)t - (.51 \pm 3) \times 10^{-6} t^2 + (.78 \pm 3) \times 10^{-7} t^3 - .0029222 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.25$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37668.0	300.97 7	344.720 5	50.319 5	.03552 2	.5069 2	14.232228 2	.85E-5 8	6.936890	31	8	.70
37672.0	315.06 7	327.956 5	50.306 4	.03564 2	.4344 2	14.232279 2	.2E-6 8	6.935981	25	8	.60
37676.0	328.86 7	311.190 9	50.296 7	.03586 4	.3629 2	14.232338 3	-.2E-5 2	6.934408	21	8	.87
37680.0	342.53 9	294.442 7	50.303 4	.03594 3	.2917 2	14.232371 3	.2E-5 2	6.933830	23	8	.99
37684.0	356.16 4	277.687 3	50.308 2	.03603 2	.2206 1	14.232409 2	.27E-5 8	6.933120	28	8	.51
37688.0	9.62 6	260.934 5	50.301 4	.03623 4	.1501 2	14.232477 2	.5E-5 1	6.931724	41	8	.65
37692.0	23.35 5	244.162 2	50.308 2	.03652 2	.0790 1	14.232570 2	.86E-5 9	6.929583	54	8	.81
37696.0	37.01 5	227.407 3	50.311 2	.03671 3	.0083 1	14.232650 2	.4E-5 1	6.928162	64	8	1.05
37700.0	50.33 4	210.646 3	50.307 2	.03685 4	.9387 1	14.232670 2	-.28E-5 9	6.927192	47	8	1.08
37704.0	63.67 2	193.882 3	50.304 3	.03694 3	.86909 6	14.232683 2	-.36E-5 8	6.926484	30	8	.71
37708.0	77.00 2	177.120 2	50.304 2	.03704 2	.79944 5	14.232685 1	-.9E-6 7	6.925802	30	8	.60
37712.0	90.30 2	160.367 6	50.301 6	.03711 3	.72992 6	14.232690 2	.21E-5 6	6.925301	25	8	.52
37716.0	103.50 5	143.605 7	50.305 5	.03709 3	.6607 1	14.232702 2	.24E-5 9	6.925445	26	8	.53
37720.0	116.8 3	126.846 6	50.305 5	.0370 1	.591 1	14.232716 2	.36E-5 9	6.926344	20	8	.45
37724.0	130.43 3	110.076 6	50.316 5	.03678 3	.52131 9	14.232712 2	-.19E-5 7	6.927680	14	8	.51
37728.0	143.84 2	93.324 2	50.310 2	.03663 3	.45195 6	14.232681 2	-.2E-5 1	6.928712	23	8	.70
37732.0	157.30 2	76.564 2	50.311 2	.03652 3	.38250 6	14.232627 2	-.30E-5 8	6.929572	35	8	.75
37736.0	170.85 4	59.801 4	50.309 3	.03640 4	.3128 1	14.232574 2	-.15E-5 7	6.930403	28	8	.72
37740.0	184.48 5	43.042 9	50.306 7	.03611 4	.2429 1	14.232525 4	.3E-6 9	6.932560	14	8	.65
37744.0	198.1 1	26.287 8	50.311 6	.03589 4	.1731 3	14.232489 7	.1E-5 9	6.934114	11	8	.55
37748.0	211.60 8	9.49 2	50.319 6	.0369 3	.1042 3	14.232447 6	.9E-5 2	6.926928	24	8	.27
37752.0	225.60 6	352.778 5	50.305 3	.0358 2	.0333 2	14.232440 1	-.7E-6 5	6.934246	31	8	.34

Table 4

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1959 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37668.	568.	-41.3	21.8	13.6	-0.839E-07
37672.	564.	-32.9	12.2	6.8	-0.197E-08
37676.	559.	-23.4	3.2	357.0	0.197E-07
37680.	557.	-13.4	15.7	345.7	-0.197E-07
37684.	555.	-3.0	31.0	333.6	-0.267E-07
37688.	554.	7.4	46.6	321.3	-0.494E-07
37692.	553.	17.8	61.3	309.6	-0.849E-07
37696.	554.	27.6	74.2	299.0	-0.395E-07
37700.	556.	36.3	84.2	290.1	0.276E-07
37704.	558.	43.6	90.5	283.9	0.355E-07
37708.	559.	48.6	93.0	281.1	0.889E-08
37712.	560.	50.3	92.6	280.8	-0.207E-07
37716.	559.	48.4	91.4	280.3	-0.237E-07
37720.	558.	43.4	91.0	277.5	-0.355E-07
37724.	557.	35.9	93.2	271.7	0.188E-07
37728.	555.	27.0	99.0	263.1	0.197E-07
37732.	553.	17.3	107.9	252.7	0.296E-07
		PERIGEE IN EARTH SHADOW			
37736.	552.	7.0	118.8	241.3	0.148E-07
37740.	554.	-3.4	130.1	229.6	-0.296E-08
37744.	557.	-13.8	139.8	218.2	-0.987E-08
37748.	552.	-23.8	145.4	207.4	-0.889E-07
37752.	562.	-33.4	145.1	198.7	0.691E-08

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37665.0	168.68 5	90.271 8	47.266 4	.06708 4	.0207 1	12.38949 1	-.12E-3 3	7.359571	15	2	.56
37666.0	172.29 4	87.031 5	47.261 3	.06666 4	.4103 1	12.38924 1	-.14E-3 2	7.362982	21	2	.55
37667.0	175.98 4	83.789 5	47.270 2	.06616 3	.7994 1	12.38895 1	-.14E-3 2	7.367011	30	2	.53
37668.0	179.64 3	80.549 5	47.271 2	.06575 2	.18832 8	12.388683 6	-.15E-3 1	7.370409	33	2	.39
37669.0	183.37 3	77.310 4	47.270 2	.06526 2	.57673 9	12.388400 7	-.13E-3 1	7.374387	28	2	.34
37670.0	187.10 5	74.073 5	47.272 5	.06477 3	.9649 2	12.388036 9	-.21E-3 1	7.378353	19	2	.34
37671.0	190.88 7	70.829 6	47.274 5	.06429 5	.3527 2	12.387817 8	-.18E-3 1	7.382271	14	2	.43
37672.0	194.54 8	67.58 1	47.274 5	.06387 6	.7405 2	12.38757 2	-.9E-4 3	7.385642	12	2	.50
37673.0	198.5 2	64.33 3	47.30 1	.0636 1	.1274 5	12.38719 4	-.19E-3 9	7.387846	13	2	.88
37674.0	202.1 1	61.12 2	47.29 1	.0630 1	.5147 4	12.38711 2	-.22E-3 6	7.392878	21	2	1.28
37675.0	205.71 5	57.883 5	47.279 4	.06259 3	.9020 1	12.38693 1	-.5E-4 2	7.396032	17	2	.47
37676.0	209.49 4	54.645 4	47.279 3	.06215 3	.2887 1	12.38679 1	-.11E-3 2	7.399565	22	2	.43
37677.0	213.18 4	51.412 4	47.280 3	.06175 3	.6755 1	12.386582 6	-.10E-3 1	7.402778	26	2	.42
37678.0	216.88 3	48.176 3	47.284 3	.06135 2	.06207 9	12.386389 6	-.8E-4 1	7.405979	28	2	.36
37679.0	220.66 3	44.949 3	47.279 3	.06096 2	.44820 8	12.386206 7	-.11E-3 1	7.409199	33	2	.37
37680.0	224.39 3	41.725 3	47.273 2	.06052 2	.8343 1	12.385977 6	-.12E-3 1	7.412719	38	2	.44
37681.0	228.20 4	38.491 2	47.276 3	.06003 3	.2200 1	12.385788 7	-.6E-4 1	7.416699	44	2	.54
37682.0	231.87 4	35.260 2	47.276 2	.05965 3	.6059 1	12.385579 5	-.124E-3 9	7.419781	45	2	.47
37683.0	235.56 4	32.031 2	47.275 2	.05927 3	.9915 1	12.385352 7	-.12E-3 1	7.422849	50	2	.51
37684.0	239.39 3	28.802 2	47.275 2	.05878 3	.3765 1	12.385117 6	-.11E-3 1	7.426827	51	2	.48
37685.0	243.17 4	25.571 3	47.271 3	.05828 3	.7614 1	12.384876 7	-.10E-3 1	7.430812	46	2	.51
37686.0	246.86 3	22.344 2	47.275 2	.05787 2	.14630 8	12.384624 5	-.15E-3 1	7.434158	44	2	.34
37687.0	250.68 4	19.115 3	47.268 3	.05737 3	.5306 1	12.384334 6	-.14E-3 1	7.438207	55	2	.41
37688.0	254.42 5	15.885 5	47.265 4	.05690 4	.9148 1	12.384043 8	-.14E-3 2	7.442069	42	2	.48
37689.0	258.00 4	12.659 3	47.271 3	.05655 3	.2993 1	12.383778 6	-.13E-3 1	7.444938	35	2	.39
37690.0	261.73 4	9.432 3	47.270 3	.05609 3	.6830 1	12.383503 7	-.10E-3 1	7.448664	35	2	.36
37691.0	265.55 6	6.192 7	47.259 4	.05560 4	.0663 2	12.383252 7	-.16E-3 2	7.452669	27	2	.35
37692.0	269.26 2	2.981 4	47.265 2	.05514 2	.44955 7	12.383003 5	-.10E-3 1	7.456400	53	2	.27
37693.0	273.06 2	359.761 5	47.266 2	.05462 2	.83239 6	12.382803 5	-.88E-4 9	7.460565	73	2	.32
37694.0	276.83 3	356.527 4	47.258 2	.05412 2	.21510 8	12.382582 5	-.108E-3 9	7.464617	64	2	.40
37695.0	280.60 3	353.300 3	47.257 2	.05362 2	.59764 8	12.382398 5	-.101E-3 9	7.468604	44	2	.31

T (M.JD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37696.0	284.49 6	350.069 6	47.248 3	.05304 5	.9796 2	12.38217 1	-.12E-3 2	7.473289	28	2	.42
37697.0	288.05 5	346.833 5	47.255 2	.05267 3	.3624 1	12.381983 9	-.7E-4 1	7.476291	32	2	.46
37698.0	291.82 4	343.615 4	47.264 1	.05227 3	.7443 1	12.381808 5	-.8E-4 1	7.479470	33	2	.48
37699.0	295.72 6	340.387 6	47.261 2	.05175 4	.1258 2	12.38160 1	-.00011 2	7.483700	27	2	.64
37700.0	299.50 5	337.144 4	47.249 2	.05126 3	.5073 1	12.381211 7	.4E-4 1	7.487697	45	2	.47
37701.0	303.79 4	333.915 4	47.465 2	.05092 3	.8886 1	12.381269 9	.3E-4 2	7.490384	42	2	.37
37702.0	307.32 7	330.689 7	47.250 3	.05035 4	.2695 2	12.381079 9	-.8E-4 3	7.494928	44	2	.72
37703.0	311.20 4	327.457 4	47.247 1	.04998 2	.6505 1	12.380960 7	.1E-5 1	7.497874	33	2	.29
37704.0	315.18 5	324.240 5	47.253 1	.04938 3	.0309 1	12.380853 9	-.10E-3 2	7.502726	51	2	.48
37705.0	319.12 3	321.008 4	47.2516 9	.04902 2	.4115 1	12.380755 6	-.10E-3 1	7.505563	57	2	.36
37706.0	323.03 4	317.780 4	47.251 1	.04869 2	.7920 1	12.380594 5	-.107E-3 8	7.508242	53	2	.38
37707.0	326.90 4	314.554 5	47.254 1	.04836 2	.1724 1	12.380492 7	-.4E-4 1	7.510879	44	2	.41
37708.0	330.75 5	311.338 5	47.256 2	.04804 2	.5528 1	12.380427 7	-.4E-4 1	7.513406	32	2	.41
37709.0	334.73 3	308.109 3	47.260 1	.04767 1	.9327 1	12.380349 4	-.29E-4 9	7.516394	38	2	.27
37710.0	338.64 5	304.878 5	47.265 2	.04736 2	.3127 1	12.380306 6	-.2E-4 1	7.518820	32	2	.37
37711.0	342.53 5	301.649 4	47.269 2	.04705 2	.6928 1	12.380280 5	-.1E-4 1	7.521307	25	2	.41
37712.0	346.56 4	298.431 2	47.273 1	.04671 1	.0724 1	12.380294 5	.1E-5 1	7.524020	37	2	.32
37713.0	350.46 3	295.221 2	47.274 1	.04640 1	.45231 9	12.380329 4	.7E-5 7	7.526403	55	2	.32
37714.0	354.39 5	292.000 3	47.278 2	.04607 2	.8322 1	12.380336 7	-.1E-4 1	7.529019	68	2	.49
37715.0	358.34 5	288.780 3	47.286 2	.04580 2	.2120 1	12.380389 6	.1E-4 1	7.531150	71	2	.49
37716.0	2.11 5	285.560 3	47.286 3	.04554 2	.5924 1	12.380463 6	.4E-4 1	7.533178	57	2	.37
37717.0	5.98 4	282.343 3	47.288 2	.04529 2	.9726 1	12.380543 5	.6E-4 1	7.535110	62	2	.40
37718.0	9.69 3	279.126 3	47.285 2	.04505 2	.35330 9	12.380684 7	.5E-4 1	7.536959	67	2	.42
37719.0	13.39 4	275.907 3	47.282 3	.04477 2	.7342 1	12.380839 6	.7E-4 1	7.539093	55	2	.48
37720.0	17.36 3	272.695 2	47.289 2	.04443 2	.11437 9	12.381035 6	.10E-3 1	7.541648	44	2	.38
37721.0	21.14 3	269.479 3	47.288 2	.04403 2	.4953 1	12.381241 7	.13E-3 1	7.544757	44	2	.52
37722.0	24.84 3	266.256 3	47.283 2	.04369 2	.87676 9	12.381516 7	.13E-3 1	7.547308	36	2	.45
37723.0	28.52 3	263.030 2	47.280 2	.04332 2	.25853 8	12.381832 5	.197E-3 9	7.550104	29	2	.30

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37724.0	32.27 3	259.812 2	47.278 1	.04292 3	.64040 9	12.382126 6	.9E-4 1	7.553187	36	2	.34
37725.0	35.79 3	256.588 2	47.276 1	.04267 3	.0231 1	12.382344 4	.136E-3 8	7.555069	46	2	.40
37726.0	39.14 4	253.367 2	47.273 1	.04221 4	.4058 1	12.382597 5	.12E-3 1	7.558605	36	2	.45
37727.0	43.00 4	250.133 4	47.273 2	.04168 4	.7888 1	12.382825 8	.13E-3 1	7.562588	27	2	.52
37728.0	46.64 3	246.916 2	47.273 2	.04112 3	.17182 9	12.383069 7	.9E-4 1	7.566951	27	2	.39
37729.0	50.11 5	243.695 3	47.268 2	.04067 5	.5556 1	12.383249 7	.6E-4 1	7.570468	30	2	.53
37730.0	53.58 4	240.472 3	47.266 2	.04008 5	.9393 1	12.383288 7	-.1E-5 1	7.575065	31	2	.47
37731.0	57.04 4	237.250 3	47.266 3	.03959 6	.3232 1	12.383272 9	-.1E-4 2	7.578943	28	2	.54
37732.0	60.49 6	234.031 5	47.258 6	.03907 9	.7070 2	12.38318 1	-.4E-4 3	7.583098	23	2	.76
37733.0	63.77 4	230.818 5	47.256 4	.03845 5	.0910 1	12.38304 1	-.5E-4 2	7.588062	26	2	.62
37734.0	67.30 4	227.596 3	47.248 3	.03778 4	.4743 1	12.382918 8	-.4E-4 2	7.593400	27	2	.52
37735.0	70.76 5	224.379 6	47.239 6	.03711 6	.8575 1	12.38277 1	-.5E-4 2	7.598711	25	2	.78
37736.0	74.13 4	221.163 4	47.243 4	.03660 4	.2409 1	12.38264 1	-.2E-4 2	7.602792	35	2	.57
37737.0	77.69 4	217.943 5	47.242 4	.03593 5	.6235 1	12.38240 1	-.19E-3 2	7.608173	35	2	.52
37738.0	80.95 4	214.719 6	47.232 4	.03505 5	.0068 1	12.38229 1	-.10E-3 2	7.615196	26	2	.53
37739.0	84.34 4	211.514 5	47.231 4	.03450 4	.3895 1	12.382137 8	-.10E-3 2	7.619602	42	2	.51
37740.0	87.73 3	208.290 5	47.222 3	.03381 3	.77203 9	12.381987 6	-.11E-3 1	7.625142	54	2	.49
37741.0	91.17 3	205.073 4	47.221 2	.03310 3	.15426 8	12.381845 5	-.87E-4 9	7.630778	47	2	.41
37742.0	94.69 3	201.864 4	47.222 2	.03238 3	.53613 7	12.381712 5	-.31E-4 9	7.636484	47	2	.39
37743.0	98.25 4	198.646 6	47.220 3	.03168 4	.9178 1	12.381620 8	-.3E-4 1	7.642088	41	2	.50
37744.0	101.88 3	195.419 5	47.215 2	.03085 4	.29910 9	12.381565 9	-.7E-4 1	7.648620	39	2	.40
37745.0	105.38 3	192.198 4	47.212 1	.03012 3	.68070 8	12.381482 6	-.3E-4 1	7.654425	40	2	.34
37746.0	109.02 4	188.982 7	47.208 2	.02935 5	.0618 1	12.381404 9	-.3E-4 2	7.660535	38	2	.49
37747.0	112.70 3	185.779 4	47.208 1	.02862 3	.44274 9	12.381355 6	.2E-4 1	7.666339	39	2	.36
37748.0	116.37 3	182.555 4	47.208 1	.02798 3	.82365 9	12.381284 5	-.36E-4 9	7.671443	51	2	.40
37749.0	120.05 5	179.328 5	47.207 2	.02722 4	.20445 1	12.381253 7	.2E-4 1	7.677387	58	2	.60
37750.0	123.56 5	176.102 5	47.210 2	.02636 4	.5856 1	12.377799 7	-.2E-4 1	7.685645	49	2	.52
37751.0	127.40 6	172.891 5	47.213 2	.02569 3	.9658 2	12.377866 6	-.1E-4 1	7.690918	42	2	.48
37752.0	132.1 1	169.677 9	47.218 3	.02503 7	.3436 3	12.37781 2	-.3E-4 3	7.696121	29	2	.84
37753.0	136.3 2	166.44 1	47.228 5	.0243 1	.7226 5	12.37791 2	.10E-3 4	7.701850	21	2	1.04
37754.0	139.79 9	163.233 5	47.221 2	.02385 4	.1036 3	12.377962 9	.9E-4 2	7.705364	29	2	.50

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37755.0	143.98 4	160.036 3	47.2208 9	.02332 2	.4825 1	12.378037 8	-.2E-4 1	7.709561	44	2	.27
37756.0	148.07 4	156.818 3	47.224 1	.02262 2	.8617 1	12.378043 1	-.7E-4 2	7.715027	48	2	.32
37757.0	152.23 5	153.610 4	47.226 1	.02207 3	.2406 1	12.378146 5	.10E-4 8	7.719358	39	2	.32
37758.0	156.5 1	150.397 5	47.235 3	.02140 4	.6189 3	12.378186 7	.4E-4 1	7.724662	28	2	.49
37759.0	160.9 1	147.185 5	47.244 4	.02077 5	.9971 4	12.37827 1	.4E-5 9	7.729542	15	2	.52
37760.0	165.1 2	143.975 8	47.252 7	.02016 7	.3755 6	12.37833 1	.5E-4 2	7.734335	17	2	.83
37761.0	169.23 5	140.779 2	47.244 1	.01979 2	.7543 2	12.378405 5	.59E-4 6	7.737260	34	2	.28
37762.0	173.45 5	137.568 2	47.2428 9	.01926 2	.1327 1	12.378561 5	.101E-3 6	7.741374	43	2	.28
37763.0	178.02 9	134.357 4	47.250 3	.01869 3	.5101 2	12.378695 7	.10E-3 1	7.745800	47	2	.57
37764.0	182.28 6	131.148 3	47.254 2	.01818 3	.8884 2	12.378872 6	.95E-4 9	7.749734	62	2	.47
37765.0	186.62 6	127.947 2	47.255 1	.01767 2	.2666 2	12.379086 5	.152E-3 9	7.753696	58	2	.43
37766.0	191.01 6	124.738 2	47.259 2	.01708 3	.6447 2	12.379343 6	.15E-3 1	7.758285	57	2	.50
37767.0	195.06 6	121.524 2	47.253 1	.01661 3	.0239 2	12.379607 4	.147E-3 8	7.761870	60	2	.41
37768.0	199.54 8	118.312 3	47.256 2	.01604 5	.4021 2	12.379895 6	.18E-3 1	7.766250	33	2	.66
37769.0	203.61 7	115.100 2	47.254 1	.01548 4	.7815 2	12.380220 7	.16E-3 1	7.770553	33	2	.50
37770.0	207.57 4	111.888 1	47.2526 7	.01502 2	.1615 1	12.380527 3	.166E-3 6	7.774016	66	2	.27
37771.0	211.25 4	108.677 1	47.2498 6	.01455 2	.5425 1	12.380902 3	.175E-3 7	7.777557	82	2	.25
37772.0	215.19 4	105.461 1	47.2490 6	.01392 2	.9230 1	12.381262 3	.148E-3 6	7.782356	59	2	.18
37773.0	219.08 3	102.246 1	47.2504 6	.01330 1	.3038 1	12.381657 3	.204E-3 5	7.787105	63	2	.17
37774.0	222.77 5	99.035 2	47.249 1	.01270 2	.6855 1	12.382017 4	.147E-3 7	7.791726	78	2	.29
37775.0	226.27 7	95.831 2	47.247 1	.01207 3	.0679 2	12.382367 5	.19E-3 1	7.796529	63	2	.42
37776.0	229.73 4	92.623 2	47.250 1	.01150 2	.4506 1	12.382731 3	.201E-3 6	7.800839	44	2	.26
37777.0	233.13 6	89.409 2	47.245 1	.01083 2	.8337 2	12.383101 5	.17E-3 1	7.806028	36	2	.29
37778.0	236.63 8	86.201 3	47.241 2	.01012 4	.2168 2	12.383423 7	.13E-3 2	7.811445	39	2	.39
37779.0	239.9 1	82.996 4	47.240 2	.00956 5	.6006 3	12.383683 7	.15E-3 1	7.815768	39	2	.43
37780.0	242.98 8	79.779 3	47.234 2	.00891 4	.9851 2	12.383940 7	.14E-3 1	7.820782	27	2	.33
37781.0	245.5 2	76.565 5	47.229 4	.00825 7	.3712 6	12.38424 1	.25E-3 3	7.825903	36	2	.49
37782.0	249.4 1	73.354 4	47.218 2	.00762 5	.7537 3	12.384425 8	.10E-3 1	7.830782	48	2	.53
37783.0	252.38 9	70.145 3	47.214 2	.00695 4	.1389 3	12.384629 6	.9E-4 1	7.836011	55	2	.56
37784.0	255.2 1	66.933 3	47.210 2	.00622 4	.5245 3	12.384825 7	.9E-4 1	7.841691	58	2	.64

Table 5

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37665.	982.	8.3	36.2	341.5	0.156E-05
37666.	985.	5.7	34.8	339.7	0.182E-05
37667.	989.	3.0	33.7	337.9	0.182E-05
37668.	992.	0.3	32.8	336.0	0.195E-05
37669.	996.	-2.5	32.2	334.2	0.169E-05
37670.	1000.	-5.2	31.8	332.4	0.274E-05
37671.	1004.	-8.0	31.7	330.7	0.235E-05
37672.	1008.	-10.6	32.0	328.9	0.117E-05
37673.	1011.	-13.5	32.2	327.3	0.248E-05
37674.	1016.	-16.0	32.9	325.7	0.287E-05
37675.	1020.	-18.6	33.8	324.0	0.652E-06
37676.	1024.	-21.2	34.7	322.6	0.143E-05
37677.	1028.	-23.7	35.7	321.2	0.130E-05
37678.	1032.	-26.2	36.8	320.0	0.104E-05
37679.	1036.	-28.6	37.8	318.9	0.143E-05
37680.	1040.	-30.9	38.8	318.0	0.156E-05
37681.	1045.	-33.2	39.7	317.3	0.782E-06
37682.	1049.	-35.3	40.6	316.6	0.162E-05
37683.	1052.	-37.3	41.4	316.2	0.156E-05
37684.	1057.	-39.2	42.0	316.1	0.143E-05
37685.	1062.	-41.0	42.5	316.2	0.130E-05
37686.	1066.	-42.5	43.0	316.4	0.196E-05
37687.	1070.	-43.9	43.2	317.0	0.183E-05

Table 5 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37688.	1074.	-45.0	43.3	317.7	0.183E-05
37689.	1078.	-45.9	43.4	318.4	0.170E-05
37690.	1082.	-46.6	43.2	319.4	0.130E-05
37691.	1086.	-47.1	42.8	320.7	0.209E-05
37692.	1090.	-47.3	42.4	321.9	0.130E-05
37693.	1094.	-47.2	41.8	323.2	0.115E-05
37694.	1098.	-46.8	41.1	324.5	0.141E-05
37695.	1101.	-46.2	40.3	325.6	0.132E-05
37696.	1106.	-45.3	39.4	326.8	0.157E-05
37697.	1108.	-44.3	38.7	327.3	0.913E-06
37698.	1111.	-43.0	37.8	328.0	0.104E-05
37699.	1115.	-41.4	36.8	328.6	0.144E-05
37700.	1118.	-39.7	36.0	328.8	-0.522E-06
37701.	1120.	-37.8	34.7	329.4	-0.391E-06
37702.	1124.	-35.7	34.4	328.8	0.104E-05
37703.	1126.	-33.5	33.8	328.5	-0.130E-07
37704.	1130.	-31.2	33.4	328.1	0.130E-05
37705.	1132.	-28.7	33.3	327.4	0.130E-05
37706.	1134.	-26.2	33.5	326.5	0.140E-05
37707.	1136.	-23.6	33.9	325.5	0.522E-06
37708.	1138.	-21.0	34.7	324.4	0.522E-06
37709.	1140.	-18.3	35.7	323.2	0.378E-06
37710.	1142.	-15.5	37.0	321.9	0.261E-06
37711.	1144.	-12.7	38.5	320.5	0.130E-06

Table 5 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37712.	1146.	-9.8	40.1	319.2	-0.130E-07
37713.	1148.	-7.0	42.0	317.7	-0.913E-07
37714.	1151.	-4.1	44.0	316.2	0.130E-06
37715.	1153.	-1.2	46.0	314.7	-0.130E-06
37716.	1155.	1.6	48.3	313.1	-0.522E-06
37717.	1157.	4.4	50.5	311.6	-0.783E-06
37718.	1159.	7.1	52.7	309.9	-0.652E-06
37719.	1161.	9.8	55.0	308.3	-0.913E-06
37720.	1164.	12.7	57.1	307.0	-0.130E-05
37721.	1168.	15.4	59.2	305.5	-0.170E-05
37722.	1171.	18.0	61.2	304.1	-0.170E-05
37723.	1174.	20.5	63.2	302.7	-0.257E-05
37724.	1178.	23.1	65.0	301.5	-0.117E-05
37725.	1181.	25.4	66.7	300.2	-0.177E-05
37726.	1185.	27.6	68.4	298.9	-0.157E-05
37727.	1190.	30.1	69.7	298.2	-0.170E-05
37728.	1195.	32.3	70.9	297.4	-0.117E-05
37729.	1199.	34.3	71.9	296.6	-0.783E-06
37730.	1204.	36.2	72.8	296.0	0.130E-07
37731.	1209.	38.0	73.6	295.6	0.130E-06
37732.	1213.	39.7	74.1	295.3	0.522E-06
37733.	1219.	41.2	74.5	295.0	0.652E-06
37734.	1225.	42.6	74.6	295.2	0.522E-06
37735.	1231.	43.9	74.6	295.5	0.652E-06

Table 5 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37736.	1235.	44.9	74.4	295.8	0.261E-06
37737.	1241.	45.8	73.9	296.6	0.248E-05
37738.	1248.	46.5	73.6	297.1	0.130E-05
37739.	1253.	46.9	72.9	297.9	0.130E-05
37740.	1258.	47.2	72.2	298.7	0.143E-05
37741.	1264.	47.2	71.3	299.6	0.113E-05
37742.	1270.	47.0	70.3	300.7	0.404E-06
37743.	1275.	46.6	69.2	301.7	0.391E-06
37744.	1281.	45.9	67.9	302.7	0.913E-06
37745.	1287.	45.0	66.8	303.4	0.391E-06
37746.	1292.	43.9	65.6	304.1	0.391E-06
37747.	1298.	42.6	64.3	304.8	-0.261E-06
37748.	1302.	41.1	63.2	305.1	0.470E-06
37749.	1308.	39.4	62.1	305.3	-0.261E-06
37750.	1315.	37.7	61.4	305.0	0.261E-06
37751.	1320.	35.7	60.5	305.0	0.131E-06
37752.	1324.	33.0	58.9	305.5	0.392E-06
37753.	1329.	30.5	58.1	305.4	-0.131E-05
37754.	1332.	28.3	58.1	304.4	-0.117E-05
37755.	1335.	25.6	57.8	303.8	0.261E-06
37756.	1340.	22.8	57.8	303.0	0.914E-06

Table 5 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	ω	ψ	D.R.A.	$\dot{P}$
37757.	1343.	20.0	58.1	302.2	-0.131E-06
37758.	1348.	17.0	58.5	301.3	-0.522E-06
37759.	1352.	13.9	59.2	300.4	-0.522E-07
37760.	1357.	10.9	60.2	299.3	-0.653E-06
37761.	1359.	7.9	61.4	298.0	-0.770E-06
37762.	1363.	4.8	62.9	296.8	-0.132E-05
37763.	1367.	1.5	64.2	295.8	-0.131E-05
37764.	1371.	-1.7	65.9	294.5	-0.124E-05
37765.	1375.	-4.9	67.7	293.4	-0.198E-05
37766.	1380.	-8.1	69.5	292.3	-0.196E-05
37767.	1384.	-11.0	71.5	291.0	-0.192E-05
37768.	1389.	-14.2	73.2	290.0	-0.235E-05
37769.	1394.	-17.1	75.1	288.9	-0.209E-05
37770.	1398.	-19.9	77.1	287.7	-0.217E-05
37771.	1402.	-22.4	79.0	286.5	-0.228E-05
37772.	1408.	-25.0	80.8	285.5	-0.193E-05
37773.	1413.	-27.6	82.4	284.7	-0.266E-05
37774.	1419.	-29.9	84.0	283.8	-0.192E-05
37775.	1424.	-32.0	85.5	282.9	-0.248E-05
37776.	1429.	-34.1	86.9	282.1	-0.262E-05
37777.	1435.	-36.0	88.2	281.4	-0.222E-05
37778.	1441.	-37.8	89.3	280.9	-0.170E-05

Table 5 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 IOTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37779.	1446.	-39.4	90.4	280.4	-0.196E-05
37780.	1452.	-40.8	91.4	279.9	-0.183E-05
37781.	1457.	-41.9	92.7	278.7	-0.326E-05
37782.	1463.	-43.4	92.8	279.5	-0.130E-05
37783.	1468.	-44.4	93.5	279.2	-0.117E-05
37784.	1474.	-45.2	94.2	278.9	-0.117E-05

Satellite 1960 Xi 1 (Explorer VIII) Martha Hall

I. SAO smoothed elements

The following elements are based on 160 observations and are valid for the period January 1 through February 1, 1962.

$T_o = 37680.0$ MJD

$\omega = (202^\circ.056 \pm 4) + (2^\circ.8067 \pm 5)t - ^\circ.0001809\,t^2 + ^\circ.3484 \cos \omega$

$\Omega = (335^\circ.620 \pm 1) - (3^\circ.3822 \pm 2)t - ^\circ.3349 \times 10^{-4} t^2 + ^\circ.0102 \cos \omega$

$i = (49^\circ.953 \pm 1) - ^\circ.7781 \times 10^{-4} t - ^\circ.0044 \sin \omega$

$e = (.11979 \pm 1) + .1157 \times 10^{-4} t + .0007342 \sin \omega$

$M = (.49195 \pm 1) + (12.797999 \pm 1)t + (.685 \pm 3) \times 10^{-5} t^2 + (.26 \pm 3) \times 10^{-7} t^3 - .0007914 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.33$.

The following elements are based on 71 observations and are valid for the period February 1 through March 1, 1962.

$T_o = 37710.0$ MJD

$\omega = (286^\circ.30 \pm 1) + (2^\circ.808 \pm 2)t - ^\circ.0001809\,t^2 + ^\circ.3484 \cos \omega$

$\Omega = (234^\circ.156 \pm 2) - (3^\circ.3830 \pm 3)t - ^\circ.3349 \times 10^{-4} t^2 + ^\circ.0102 \cos \omega$

$i = (49^\circ.946 \pm 2) - ^\circ.7781 \times 10^{-4} t - ^\circ.0044 \sin \omega$

$e = (.11968 \pm 1) + .1157 \times 10^{-4} t + .0007342 \sin \omega$

$M = (.43775 \pm 2) + (12.798404 \pm 4)t + (.80 \pm 1) \times 10^{-5} t^2 + (.60 \pm 13) \times 10^{-7} t^3 - .0007914 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.45$.

The following elements are based on 134 observations and are valid for the period March 1 through April 1, 1962.

$T_o = 37738.0$ MJD

$\omega = (5^\circ.03 \pm 2) + (2^\circ.807 \pm 1)t - {}^\circ.0001809\, t^2 + {}^\circ.3484 \cos \omega$

$\Omega = (139^\circ.467 \pm 2) - (3^\circ.3846 \pm 2)t - {}^\circ.3349 \times 10^{-4} t^2 + {}^\circ.0102 \cos \omega$

$i = (49^\circ.961 \pm 2) - {}^\circ.7781 \times 10^{-4} t - {}^\circ.0044 \sin \omega$

$e = (.11950 \pm 2) + .1157 \times 10^{-4} t + .0007342 \sin \omega$

$M = (.80209 \pm 5) + (12.799093 \pm 4)t + (.1681 \pm 8) \times 10^{-4} t^2 + (.419 \pm 7) \times 10^{-6} t^3 - .0007914 \cos \omega$

Standard error of one observation: $\sigma = \pm 3''.95$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37668.0	168.023 8	16.187 3	49.944 4	.11996 4	.91765 2	12.797933 3	.11E-4 2	6.794061	35	6	.52
37672.0	179.24 4	2.652 4	49.948 3	.1197 1	.1092 2	12.797973 2	.3E-5 1	6.796023	45	6	.46
37676.0	190.47 3	349.13 2	49.953 8	.11963 7	.30087 8	12.798011 5	.12E-4 3	6.796570	38	6	.96
37680.0	201.72 1	335.607 4	49.953 4	.11946 2	.49273 2	12.798057 2	.6E-5 1	6.797838	37	6	.68
37684.0	212.96 3	322.08 1	49.957 8	.11928 5	.68485 6	12.798081 4	.6E-5 2	6.799241	12	6	1.21
37688.0	224.24 1	308.561 8	49.951 1	.11937 4	.87697 4	12.798147 3	.5E-5 2	6.798509	24	6	.39
37692.0	235.70 4	295.03 1	49.951 4	.1186 2	.0686 2	12.798227 2	.9E-5 2	6.804178	28	6	.32
37696.0	246.94 3	281.536 8	49.936 4	.1183 2	.2612 3	12.798287 2	.5E-5 1	6.806534	40	6	.42
37700.0	258.14 3	267.988 7	49.942 6	.1191 2	.4546 1	12.798340 3	.7E-5 2	6.800386	32	6	.61
37704.0	269.48 2	254.446 4	49.946 5	.11897 3	.64758 6	12.798381 4	.1E-5 2	6.801548	21	6	.82
37708.0	280.73 3	240.923 4	49.944 4	.11894 3	.84091 6	12.798417 4	.5E-5 3	6.801753	16	6	.96
37712.0	292.02 3	227.383 5	49.943 4	.11901 3	.03435 7	12.798492 4	.12E-4 3	6.801199	14	6	.92
37716.0	303.39 5	213.873 9	49.96 1	.11908 3	.2279 1	12.798584 8	.17E-4 5	6.800630	11	6	.85
37720.0											
37724.0											
37728.0	337.19 2	173.243 8	49.940 3	.11937 2	.81188 5	12.798972 2	.16E-4 1	6.798252	30	6	.60
37732.0	348.50 2	159.76 1	49.951 2	.11945 2	.00725 7	12.799085 3	.14E-4 2	6.797589	22	6	.76
37736.0	359.76 2	146.278 5	49.937 4	.11961 2	.20315 7	12.799184 4	.8E-5 2	6.796301	21	6	.72
37740.0	11.00 3	132.689 9	49.947 8	.11975 3	.39962 7	12.799314 7	.27E-4 4	6.795203	24	6	1.34
37744.0	22.07 6	119.12 3	49.98 2	.1197 1	.5971 2	12.79946 2	.19E-4 7	6.795138	14	6	2.35
37748.0	33.46 2	105.627 8	49.945 5	.11996 5	.79421 6	12.799715 4	.29E-4 2	6.793449	31	6	.99
37752.0	44.61 2	92.088 3	49.940 2	.12021 5	.99309 5	12.799976 3	.30E-4 2	6.791384	35	6	1.00

Table 6

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1960 XI 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37668.	416.	9.1	98.9	264.1	-0.134E-06
37672.	418.	0.6	105.5	253.5	-0.366E-07
		PERIGEE IN EARTH SHADOW			
37676.	419.	-8.0	111.6	242.9	-0.147E-06
37680.	421.	-16.5	116.2	232.6	-0.733E-07
37684.	425.	-24.6	118.6	223.1	-0.733E-07
37688.	426.	-32.3	118.5	214.8	-0.611E-07
37692.	434.	-39.2	116.6	208.4	-0.110E-06
37696.	439.	-44.8	114.2	203.9	-0.611E-07
37700.	434.	-48.5	112.5	201.7	-0.855E-07
37704.	436.	-49.9	112.5	201.5	-0.122E-07
37708.	436.	-48.8	114.9	201.2	-0.611E-07
37712.	434.	-45.2	119.9	199.5	-0.147E-06
37716.	431.	-39.7	127.4	195.7	-0.208E-06
37728.	422.	-17.3	155.4	172.9	-0.195E-06
37732.	420.	-8.8	158.6	163.4	-0.171E-06
37736.	418.	-0.2	153.3	153.5	-0.977E-07
37740.	417.	8.4	143.1	143.6	-0.330E-06
37744.	419.	16.7	131.5	133.8	-0.232E-06
37748.	419.	25.0	120.7	125.1	-0.354E-06
37752.	419.	32.5	110.9	117.3	-0.366E-06

Satellite 1961 Delta 1 (Explorer IX) Joan Weingarten

I. SAO smoothed elements

The following elements are based on 195 observations and are valid for the period January 5 through January 22, 1962.

$T_o = 37678.0$ MJD

$\omega = (242^\circ.18 \pm 1) + (4^\circ.793 \pm 2)t - ^\circ.0002713t^2 + ^\circ.2838 \cos \omega$

$\Omega = (47^\circ.572 \pm 2) - (3^\circ.6299 \pm 3)t - ^\circ.3893 \times 10^{-4}t^2 + ^\circ.0085 \cos \omega$

$i = (38^\circ.8240 \pm 9) - ^\circ.0001022t - ^\circ.0040 \sin \omega$

$e = (.104589 \pm 6) - (.14 \pm 1) \times 10^{-4}t + .106 \times 10^{-5}t^2 + .0005253 \sin \omega$

$M = (.32012 \pm 3) + (12.184413 \pm 6)t + (.1818 \pm 6) \times 10^{-4}t^2 + (.34 \pm 1) \times 10^{-6}t^3 - .0007344 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.10$.

The following elements are based on 310 observations and are valid for the period January 22 through February 8, 1962.

$T_o = 37695.0$ MJD

$\omega = (323^\circ.626 \pm 8) + (4^\circ.793 \pm 2)t - ^\circ.0002713t^2 + ^\circ.2838 \cos \omega$

$\Omega = (345^\circ.858 \pm 1) + (3^\circ.6303 \pm 2)t - ^\circ.3893 \times 10^{-4}t^2 + ^\circ.0085 \cos \omega$

$i = (38^\circ.8218 \pm 6) - ^\circ.0001022t - ^\circ.0040 \sin \omega$

$e = (.104381 \pm 5) - (.65 \pm 9) \times 10^{-5}t + .106 \times 10^{-5}t^2 + .0005253 \sin \omega$

$M = (.46235 \pm 2) + (12.185414 \pm 4)t + (.4408 \pm 5) \times 10^{-4}t^2 + (.39 \pm 1) \times 10^{-6}t^3 - .0007344 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.00$.

The following elements are based on 325 observations and are valid for the period February 8 through February 26, 1962.

$T_o = 37712.0$ MJD

$\omega = (45^\circ.091 \pm 6) + (4^\circ.787 \pm 1)t - ^\circ.0002713\,t^2 + ^\circ.2838 \cos \omega$

$\Omega = (284^\circ.124 \pm 1) - (3^\circ.6323 \pm 2)t - ^\circ.3893 \times 10^{-4} t^2 + ^\circ.0085 \cos \omega$

$i = (38^\circ.8209 \pm 6) - ^\circ.0001022\,t - ^\circ.0040 \sin \omega$

$e = (.104552 \pm 6) - (.22 \pm 1) \times 10^{-4} t + .106 \times 10^{-5} t^2 + .0005253 \sin \omega$

$M = (.62881 \pm 2) + (12.187246 \pm 4)t + (.6374 \pm 6) \times 10^{-4} t^2 + (.15 \pm 1) \times 10^{-6} t^3 - .0007344 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.15$.

The following elements are based on 237 observations and are valid for the period February 25 through March 14, 1962.

$T_o = 37729.0$ MJD

$\omega = (126^\circ.57 \pm 1) + (4^\circ.799 \pm 2)t - ^\circ.0002713\,t^2 + ^\circ.2838 \cos \omega$

$\Omega = (222^\circ.351 \pm 2) - (3^\circ.6345 \pm 3)t - ^\circ.3893 \times 10^{-4} t^2 + ^\circ.0085 \cos \omega$

$i = (38^\circ.8174 \pm 8) - ^\circ.0001022\,t - ^\circ.0040 \sin \omega$

$e = (.104568 \pm 7) - (.17 \pm 1) \times 10^{-4} t + .106 \times 10^{-5} t^2 + .0005253 \sin \omega$

$M = (.83056 \pm 3) + (12.189379 \pm 6)t + (.4832 \pm 9) \times 10^{-4} t^2 - (.123 \pm 2) \times 10^{-5} t^3 - .0007344 \cos \omega$

Standard error of one observation: $\sigma = \pm 1''.33$.

The following elements are based on 229 observations and are valid for the period March 14 through March 31, 1962.

$T_o = 37746.0$ MJD

$\omega = (208^\circ.11 \pm 2) + (4^\circ.793 \pm 3)t - ^\circ.495 \times 10^{-4} t^2 + ^\circ.2838 \cos \omega$

$\Omega = (160^\circ.565 \pm 3) - (3^\circ.6348 \pm 7)t - ^\circ.5827 \times 10^{-4} t^2 + ^\circ.0085 \cos \omega$

$i = (38^\circ.820 \pm 1) + ^\circ.6200 \times 10^{-4} t - ^\circ.0040 \sin \omega$

$e = (.10452 \pm 1) + (.19 \pm 3) \times 10^{-4} t + .894 \times 10^{-6} t^2 + .0005253 \sin \omega$

$M = (.06257 \pm 5) + (12.19122 \pm 1)t + (.914 \pm 2) \times 10^{-4} t^2 + (.99 \pm 3) \times 10^{-6} t^3 - .0007344 \cos \omega$

Standard error of one observation: $\sigma = \pm 2''.30$.

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37665.0	179.5 1	94.75 2	38.820 6	.1047 1	.9254 3	12.18412 2	.15E-3 8	7.141081	12	2	1.11
37666.0	184.33 4	91.108 7	38.821 3	.10490 4	.1098 1	12.184148 8	-.5E-4 2	7.139814	17	2	.50
37667.0	189.14 4	87.480 6	38.820 3	.10480 3	.2939 1	12.18413 1	.1E-4 2	7.140549	24	2	.55
37668.0	193.92 3	83.855 6	38.821 3	.10474 2	.4782 1	12.134147 8	.1E-5 2	7.141059	23	2	.54
37669.0	198.70 5	80.237 9	38.821 4	.10473 3	.6625 1	12.18415 1	-.1E-3 2	7.141108	27	2	.84
37670.0	203.56 8	76.61 1	38.826 5	.10458 4	.8465 2	12.18409 1	-.4E-4 2	7.142336	23	2	.85
37671.0	208.36 7	72.96 1	38.827 3	.10445 4	.0307 2	12.18411 1	-.4E-4 2	7.143387	16	2	.62
37672.0	213.22 4	69.346 8	38.827 2	.10442 2	.2147 1	12.184173 9	.2E-4 2	7.143582	11	2	.29
37673.0	218.0 1	65.69 2	38.837 8	.10436 6	.3989 3	12.18417 2	-.1E-4 9	7.144120	10	2	.73
37674.0	222.89 8	62.09 1	38.831 7	.10427 5	.5830 2	12.18415 1	-.4E-4 2	7.144771	21	2	.94
37675.0	227.65 5	58.453 9	38.831 5	.10423 3	.7674 1	12.18422 1	.3E-4 2	7.145071	29	2	.82
37676.0	232.39 6	54.82 1	38.828 6	.10418 3	.9519 2	12.18423 1	-.4E-4 2	7.145463	25	2	.92
37677.0	237.22 3	51.205 5	38.821 3	.10415 2	.13614 9	12.184293 6	.1E-4 1	7.145687	18	2	.42
37678.0	242.10 7	47.56 1	38.832 7	.10413 3	.3203 2	12.18429 1	-.1E-5 23	7.145876	17	2	.81
37679.0	246.85 6	43.938 8	38.835 6	.10413 4	.5048 2	12.18437 2	.8E-4 4	7.145861	21	2	.87
37680.0	251.64 3	40.308 3	38.834 3	.10407 2	.68936 9	12.184411 7	.1E-4 1	7.146334	28	2	.50
37681.0	256.43 3	36.681 2	38.829 2	.10407 1	.87390 9	12.184429 5	.2E-4 1	7.146311	27	2	.37
37682.0	261.30 3	33.051 2	38.829 2	.10405 1	.05822 8	12.184473 7	.3E-5 12	7.146409	23	2	.31
37683.0	266.14 3	29.422 2	38.824 2	.10405 1	.24265 8	12.184516 5	.36E-4 9	7.146448	28	2	.37
37684.0	270.91 2	25.791 2	38.825 2	.10403 1	.42736 6	12.184579 5	.30E-4 8	7.146554	37	2	.33
37685.0	275.71 2	22.165 3	38.831 2	.10402 1	.61205 7	12.184628 7	.2E-4 1	7.146653	32	2	.42
37686.0	280.55 3	18.531 3	38.827 3	.10400 1	.79665 8	12.184671 6	.4E-4 1	7.146795	27	2	.40
37687.0	285.39 3	14.902 4	38.8828 2	.10398 1	.98130 8	12.184743 6	.3E-4 1	7.146856	30	2	.33
37688.0	290.16 3	11.276 4	38.830 3	.10400 1	.16620 8	12.184801 5	.4E-4 1	7.146691	30	2	.35
37689.0	295.01 2	7.641 4	38.826 2	.10402 1	.35098 7	12.184878 7	.4E-4 1	7.146551	36	2	.41
37690.0	299.82 2	4.012 4	38.827 2	.10401 1	.53591 6	12.184915 7	-.2E-4 1	7.146550	36	2	.39
37691.0	304.58 2	.381 5	38.824 2	.10399 1	.72103 6	12.185008 7	.5E-4 1	7.146678	33	2	.38
37692.0	309.37 2	356.752 5	38.822 2	.10400 2	.90617 6	12.185117 8	.6E-4 1	7.146579	31	2	.34
37693.0	314.15 2	353.120 6	38.821 2	.10393 1	.09144 7	12.185192 5	.54E-4 9	7.147130	37	2	.32
37694.0	319.00 3	349.490 6	38.825 2	.10402 1	.27657 8	12.185288 6	.4E-4 1	7.146383	50	2	.47
37695.0	323.85 3	345.865 6	38.825 2	.10406 2	.4618 1	12.18540 1	.6E-4 2	7.146020	44	2	.57

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37696.0	328.67 4	342.237 7	38.823 2	.10408 2	.6472 1	12.185483 7	.1E-4 2	7.145773	33	2	.60
37697.0	333.47 3	338.601 6	38.824 2	.10411 2	.8327 1	12.18554 1	.6E-4 2	7.145505	32	2	.55
37698.0	338.26 4	334.969 6	38.825 2	.10412 2	.0183 1	12.185639 9	.4E-4 1	7.145431	29	2	.56
37699.0	343.10 4	331.339 9	38.822 2	.10414 3	.2040 1	12.185771 9	.4E-4 1	7.145178	34	2	.58
37700.0	347.86 2	327.716 4	38.821 1	.10426 1	.38979 6	12.185856 4	.102E-3 8	7.144242	44	2	.34
37701.0	352.67 2	324.082 3	38.822 1	.10434 1	.57570 5	12.185993 5	.4E-4 1	7.143567	51	2	.36
37702.0	357.47 2	320.455 3	38.8225 9	.10438 1	.76173 5	12.186086 4	.39E-4 9	7.143181	48	2	.32
37703.0	2.24 2	316.178 3	38.823 1	.10441 1	.94793 5	12.186197 6	.50E-4 8	7.142912	34	2	.27
37704.0	7.09 2	313.182 3	38.822 1	.10448 1	.13403 6	12.186308 6	.5E-4 1	7.142302	29	2	.37
37705.0	11.86 1	309.552 3	38.823 1	.10452 1	.32041 4	12.186410 4	.59E-4 7	7.141928	43	2	.35
37706.0	16.66 2	305.926 3	38.823 1	.10460 1	.50681 5	12.186519 5	.61E-4 9	7.141241	51	2	.48
37707.0	21.44 2	302.707 3	38.822 1	.10467 2	.69340 6	12.186634 6	.4E-4 4	7.140658	54	2	.57
37708.0	26.19 2	298.659 3	38.819 2	.10473 1	.88017 5	12.186769 7	.8E-4 1	7.140095	50	2	.42
37709.0	30.97 2	295.029 3	38.819 2	.10477 1	.06699 5	12.186888 5	.64E-4 8	7.139788	50	2	.36
37710.0	35.77 1	291.400 3	38.819 2	.10482 1	.25386 4	12.187014 4	.73E-4 7	7.139262	40	2	.33
37711.0	40.56 2	287.767 4	38.819 2	.10492 2	.44088 6	12.187138 7	.7E-4 1	7.138467	39	2	.45
37712.0	45.34 3	284.136 4	38.818 2	.10503 2	.62806 8	12.187305 8	.8E-4 1	7.137482	38	2	.49
37713.0	49.11 3	280.502 4	38.818 2	.10505 3	.81541 9	12.187435 8	.1E-3 1	7.137298	35	2	.58
37714.0	54.82 2	276.864 2	38.816 1	.10506 2	.00314 5	12.187597 6	.54E-4 9	7.137122	36	2	.40
37715.0	59.61 1	273.234 2	38.817 2	.10510 1	.19069 4	12.187692 4	.67E-4 8	7.136765	38	2	.37
37716.0	64.38 1	269.602 2	38.819 2	.10517 2	.37842 4	12.187822 6	.6E-4 1	7.136167	37	2	.42
37717.0	69.14 2	265.971 4	38.818 2	.10525 3	.56630 8	12.18795 1	.8E-4 2	7.135471	30	2	.49
37718.0	73.91 4	262.335 5	38.817 2	.10523 4	.7543 1	12.18809 1	.11E-3 2	7.135469	20	2	.48
37719.0	78.69 2	258.696 3	38.815 1	.10520 2	.94242 7	12.188223 7	.9E-4 1	7.135805	21	2	.31
37720.0	83.46 2	255.059 3	38.814 1	.10521 2	.13065 6	12.188343 8	.8E-4 1	7.135644	20	2	.33
37721.0	88.24 2	251.423 3	38.816 1	.10522 2	.31901 7	12.188496 8	.4E-4 2	7.135560	25	2	.36
37722.0	92.97 2	247.790 3	38.814 2	.10523 2	.50764 8	12.18863 1	.4E-4 3	7.135392	28	2	.37
37723.0	97.75 4	244.164 5	38.816 3	.10520 3	.6963 1	12.18882 2	.13E-3 4	7.135581	22	2	.64

T (MJD)	ω	Ω	i	e	M	n	n'/2	q	N	D	σ
37724.0	102.48 3	240.529 3	38.816 2	.10519 2	.8852 1	12.188938 9	.6E-4 2	7.135621	33	2	.54
37725.0	107.23 2	236.885 3	38.821 2	.10518 2	.07426 8	12.189059 7	.6E-4 1	7.135604	40	2	.48
37726.0	112.06 3	233.245 4	38.815 2	.10513 2	.26318 9	12.189191 9	.5E-4 2	7.135960	29	2	.53
37727.0	116.89 3	229.619 5	38.810 3	.10504 3	.4522 1	12.18930 1	.5E-4 2	7.136639	24	2	.72
37728.0	121.64 2	225.981 4	38.812 2	.10506 2	.64157 7	12.18939 1	-.2E-4 2	7.136441	17	2	.44
37729.0	126.41 6	222.341 5	38.813 3	.10503 2	.8310 2	12.18947 2	.3E-4 3	7.136698	14	2	.50
37730.0	131.14 4	218.694 5	38.815 3	.10498 2	.0206 1	12.189498 8	.7E-4 2	7.137043	23	2	.50
37731.0	135.92 4	215.059 5	38.815 3	.10492 2	.2102 1	12.18956 1	.4E-4 2	7.137479	20	2	.47
37732.0	140.72 6	211.429 6	38.813 4	.10487 3	.3998 2	12.18962 2	.1E-6 3	7.137892	14	2	.51
37733.0	145.52 4	207.804 4	38.813 2	.10478 2	.5894 1	12.189671 9	.1E-4 2	7.138568	26	2	.46
37734.0	150.28 3	204.172 4	38.816 2	.10473 1	.77919 9	12.189723 7	.2E-4 1	7.138971	32	2	.44
37735.0	155.07 3	200.545 4	38.817 2	.10469 1	.96897 9	12.189835 9	.8E-4 2	7.139267	26	2	.37
37736.0	159.88 3	196.910 4	38.815 2	.10462 1	.15880 8	12.189887 7	.2E-4 1	7.139760	28	2	.32
37737.0	164.67 2	193.262 4	38.812 2	.10454 2	.34876 6	12.189983 7	.9E-4 2	7.140389	32	2	.33
37738.0	169.44 3	189.631 5	38.814 2	.10457 2	.53887 7	12.190046 7	.4E-4 2	7.140155	26	2	.45
37739.0	174.26 3	186.000 4	38.815 2	.10455 1	.72890 9	12.190124 8	.9E-4 1	7.140240	23	2	.40
37740.0	179.02 2	182.365 3	38.8164 9	.104502 8	.91923 5	12.190229 6	.3E-4 1	7.140588	28	2	.28
37741.0	183.84 2	178.731 2	38.8183 7	.104442 6	.10946 4	12.190325 3	.62E-4 6	7.141025	30	2	.24
37742.0	188.66 2	175.093 4	38.820 1	.10440 1	.29984 7	12.190466 5	.7E-4 1	7.141314	30	2	.40
37743.0	193.46 3	171.456 5	38.821 2	.10443 2	.49037 9	12.19057 1	.13E-3 2	7.141039	21	2	.48
37744.0	198.26 4	167.830 5	38.821 2	.10436 2	.6811 1	12.19083 1	.4E-4 2	7.141483	20	2	.40
37745.0	203.09 3	164.201 4	38.823 2	.10432 2	.87192 9	12.190970 8	.11E-3 1	7.141755	22	2	.39
37746.0	207.91 2	160.564 4	38.823 2	.10431 1	.06300 7	12.191160 6	.8E-4 1	7.141773	22	2	.32
37747.0	212.74 3	156.921 5	38.828 3	.10426 2	.25422 9	12.191359 8	.14E-3 1	7.142052	24	2	.39
37748.0	217.52 3	153.281 6	38.823 2	.10428 2	.44580 8	12.191551 9	.11E-3 2	7.141871	25	2	.50
37749.0	222.34 3	149.645 7	38.823 2	.10426 3	.63747 9	12.19176 1	.19E-3 3	7.141884	25	2	.57
37750.0	227.09 2	146.019 4	38.825 1	.10420 2	.82952 7	12.191948 7	.8E-4 1	7.142306	33	2	.38
37751.0	231.95 2	142.386 3	38.824 1	.10420 2	.02144 5	12.192113 8	.9E-4 1	7.142265	42	2	.32
37752.0	236.77 2	138.750 5	38.826 2	.10423 2	.21368 7	12.192328 7	.12E-3 1	7.141905	28	2	.35
37753.0	241.58 3	135.113 6	38.828 2	.10422 3	.40616 9	12.19248 1	.6E-4 2	7.141942	17	2	.40
37754.0	246.39 5	131.480 7	38.828 2	.10430 5	.5988 2	12.19265 1	.9E-4 2	7.141237	20	2	.42

Table 7

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1961 DELTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
		PERIGEE IN SUNLIGHT			
37665.	763.	0.3	24.2	353.4	-0.202E-05
37666.	761.	-2.7	21.6	352.4	0.674E-06
37667.	762.	-5.7	19.1	351.4	-0.135E-06
37668.	763.	-8.7	16.8	350.5	-0.135E-07
37669.	764.	-11.6	14.9	349.6	0.135E-05
37670.	765.	-14.5	13.3	348.9	0.539E-06
37671.	767.	-17.3	12.2	348.2	0.539E-06
37672.	768.	-20.1	11.7	347.7	-0.269E-06
37673.	769.	-22.7	11.8	347.2	0.135E-06
37674.	770.	-25.3	12.2	347.1	0.539E-06
37675.	771.	-27.6	13.1	347.0	-0.404E-06
37676.	772.	-29.8	14.1	347.1	0.539E-06
37677.	773.	-31.8	15.1	347.5	-0.135E-06
37678.	774.	-33.7	16.1	348.2	0.135E-07
37679.	775.	-35.2	17.0	348.9	-0.108E-05
37680.	776.	-36.5	17.8	349.9	-0.135E-06
37681.	776.	-37.6	18.4	351.0	-0.269E-06
37682.	776.	-38.3	18.8	352.4	-0.404E-07
37683.	776.	-38.7	19.0	353.9	-0.485E-06
37684.	777.	-38.8	19.0	355.3	-0.404E-06
37685.	777.	-38.6	18.8	356.8	-0.269E-06

Table 7 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1961 DELTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37686.	777.	-38.1	18.3	358.2	-0.539E-06
37687.	776.	-37.2	17.6	359.6	-0.404E-06
37688.	776.	-36.1	16.7	0.7	-0.539E-06
37689.	775.	-34.6	15.6	1.7	-0.539E-06
37690.	775.	-33.0	14.2	2.4	0.269E-06
37691.	774.	-31.1	12.7	2.9	-0.674E-06
37692.	773.	-29.0	11.0	3.2	-0.808E-06
37693.	773.	-26.7	9.2	3.3	-0.727E-06
37694.	772.	-24.3	7.1	3.3	-0.539E-06
37695.	771.	-21.7	5.1	3.1	-0.808E-06
37696.	770.	-19.0	3.1	2.7	-0.135E-06
37697.	769.	-16.3	2.2	2.2	-0.808E-06
37698.	768.	-13.4	3.6	1.6	-0.539E-06
37699.	768.	-10.5	6.0	0.9	-0.539E-06
37700.	766.	-7.6	8.6	0.0	-0.137E-05
37701.	765.	-4.6	11.3	359.2	-0.539E-06
37702.	765.	-1.6	14.0	358.3	-0.525E-06
37703.	765.	1.4	16.9	356.7	-0.673E-06
37704.	764.	4.4	19.6	356.5	-0.673E-06
37705.	764.	7.4	22.4	355.7	-0.795E-06
37706.	764.	10.4	25.1	354.9	-0.821E-06
37707.	763.	13.2	27.7	354.6	-0.539E-06
37708.	763.	16.1	30.3	353.5	-0.108E-05
37709.	764.	18.8	32.8	353.0	-0.862E-06

Table 7 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1961 DELTA 1

MJD	Z	φ	Ψ	D.R.A.	$\dot{P}$
37710.	764.	21.5	35.2	352.6	-0.983E-06
37711.	764.	24.1	37.4	352.4	-0.943E-06
37712.	763.	26.5	39.4	352.4	-0.108E-05
37713.	764.	28.3	41.0	351.5	-0.135E-05
37714.	764.	30.8	42.9	352.8	-0.727E-06
37715.	765.	32.7	44.4	353.3	-0.902E-06
37716.	765.	34.4	45.6	354.1	-0.808E-06
37717.	764.	35.9	46.5	355.1	-0.108E-05
37718.	765.	37.0	47.2	356.2	-0.148E-05
37719.	766.	37.9	47.7	357.5	-0.121E-05
37720.	766.	38.5	47.9	359.0	-0.108E-05
37721.	766.	38.8	47.8	0.5	-0.539E-06
37722.	765.	38.8	47.4	2.0	-0.538E-06
37723.	765.	38.4	46.7	3.5	-0.175E-05
37724.	765.	37.7	45.8	4.9	-0.808E-06
37725.	765.	36.8	44.6	6.2	-0.808E-06
37726.	765.	35.5	43.2	7.4	-0.673E-06
37727.	765.	34.0	41.5	8.4	-0.673E-06
37728.	764.	32.2	39.5	9.1	0.269E-06
37729.	764.	30.3	37.4	9.6	-0.404E-06
37730.	763.	28.2	35.0	9.9	-0.942E-06
37731.	763.	25.9	32.5	10.0	-0.538E-06
37732.	763.	23.4	29.8	10.0	-0.135E-08
37733.	763.	20.8	26.9	9.8	-0.135E-06

Table 7 (cont.)

RELATIVE POSITIONS OF THE SUN AND THE PERIGEE OF SATELLITE 1961 DELTA 1

MJD	Z	φ	ψ	D.R.A.	$\dot{P}$
37734.	763.	18.1	24.0	9.4	-0.269E-06
37735.	762.	15.3	20.9	9.0	-0.108E-05
37736.	762.	12.5	17.7	8.4	-0.269E-06
37737.	763.	9.5	14.5	7.7	-0.121E-05
37738.	762.	6.6	11.4	6.9	-0.538E-06
37739.	762.	3.6	8.3	6.2	-0.121E-05
37740.	762.	0.6	5.8	5.3	-0.404E-06
37741.	763.	-2.4	4.7	4.5	-0.834E-06
37742.	763.	-5.4	5.9	3.8	-0.942E-06
37743.	763.	-8.4	8.5	3.0	-0.175E-05
37744.	764.	-11.3	11.5	2.3	-0.538E-06
37745.	765.	-14.2	14.7	1.7	-0.148E-05
37746.	765.	-17.1	17.9	1.3	-0.108E-05
37747.	766.	-19.8	21.0	0.9	-0.188E-05
37748.	767.	-22.4	24.0	0.6	-0.148E-05
37749.	767.	-25.0	26.9	0.5	-0.256E-05
37750.	768.	-27.3	29.7	0.6	-0.108E-05
37751.	769.	-29.6	32.3	1.0	-0.121E-05
37752.	769.	-31.6	34.8	1.5	-0.161E-05
37753.	770.	-33.5	37.0	2.2	-0.807E-06
37754.	770.	-35.1	39.1	3.2	-0.121E-05